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See Advt. page xxxvi.

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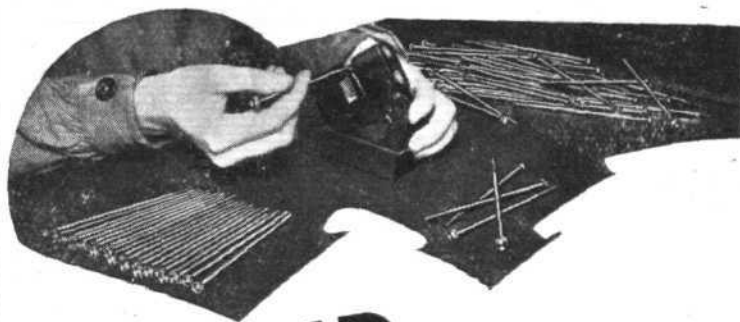


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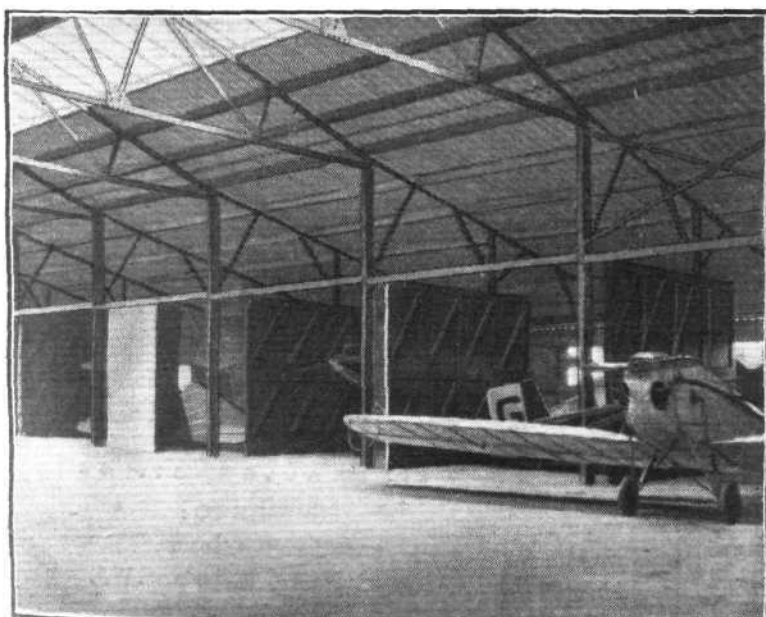
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A model of the "Rohrbach-Romar," 5 metres in size, is on view at the "International Aero Exhibition, Olympia," at London, from July 16th to August 1st, 1929, so that all details can be easily inspected and studied.

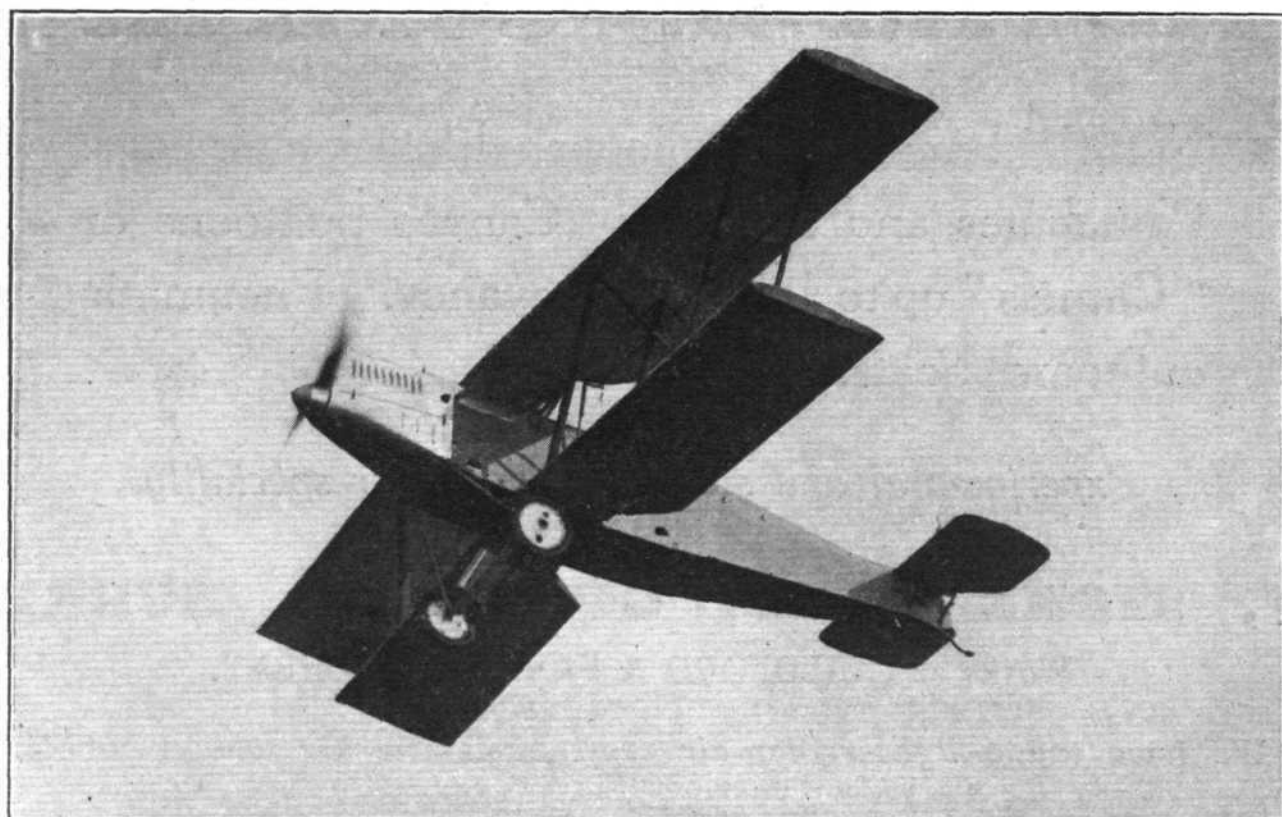
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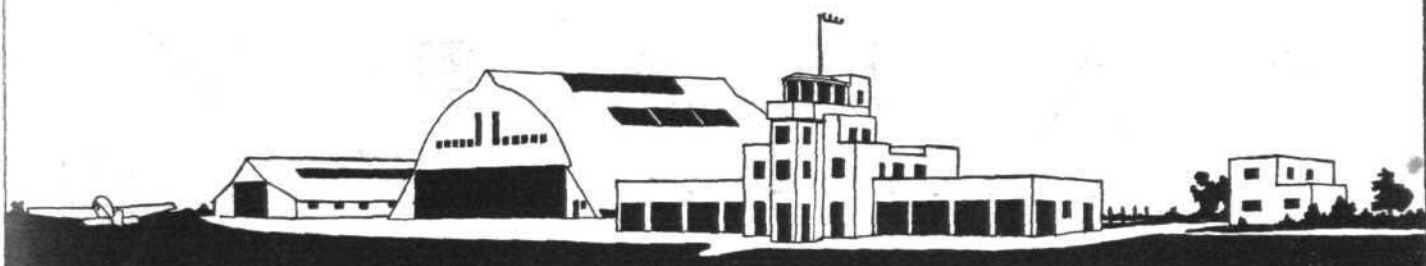
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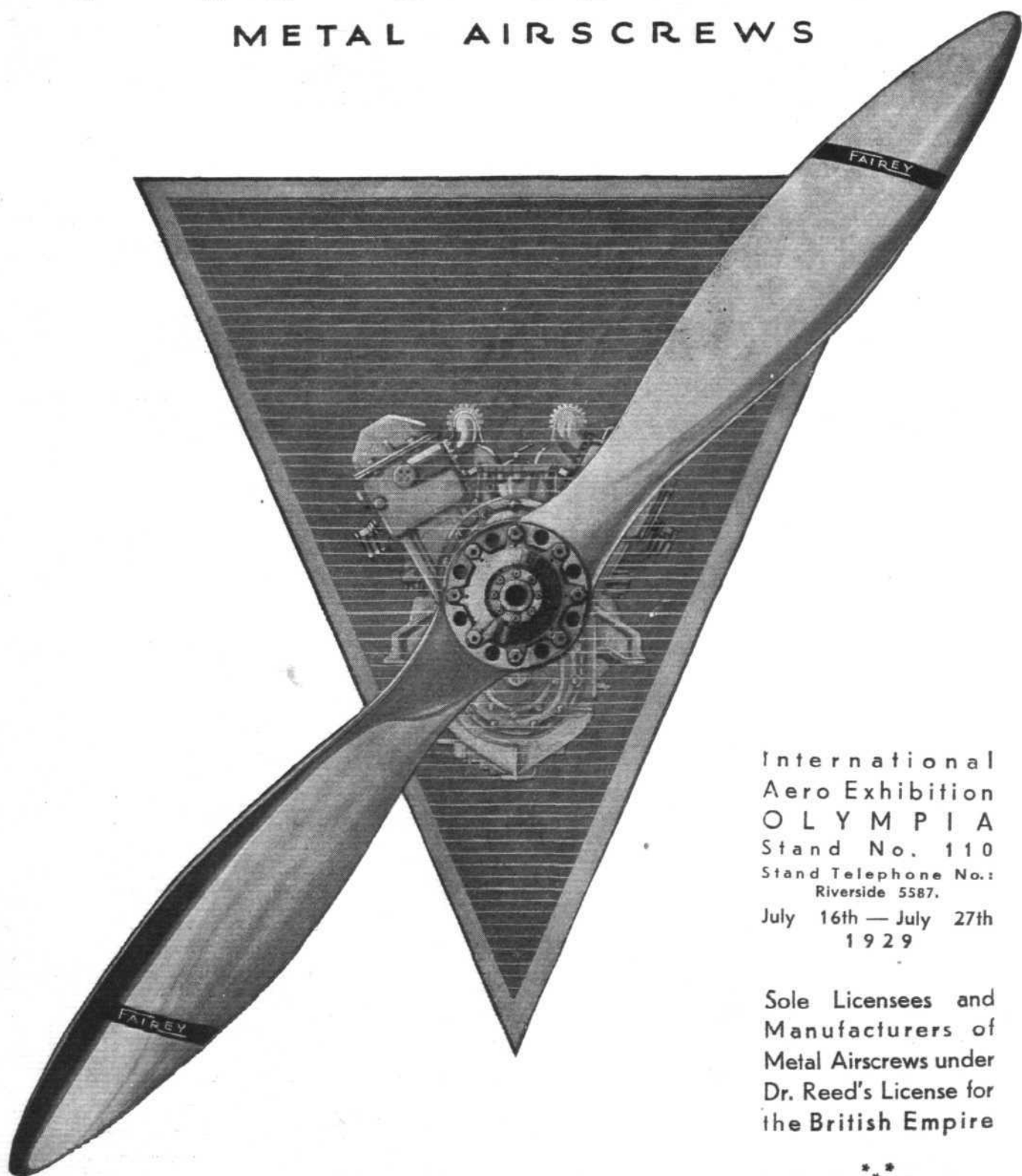
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A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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JULY 25, 1929

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## CONTENTS

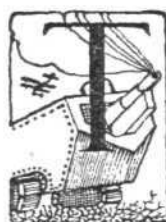
	PAGE
Editorial Comment:	
The Do. X .. .. .	743
Do. X. .. .. .	745
Olympia Show: Leaves from our Sketch Book .. .. .	747
Olympia: Some of the Stands .. .. .	754
Foreign Engines at Olympia .. .. .	761
THE AIRCRAFT ENGINEER .. .. .	778a
Accessories at Olympia .. .. .	779
Mono-Spar Wing .. .. .	796
Aviation Banquet to our Foreign Visitors .. .. .	797
Australian Minister welcomes Sqdn-Ldr. Kingsford Smith .. .. .	798
Private Flying: Air Garden Party at Heston .. .. .	800
Light 'Plane Clubs .. .. .	806
World Tour by Gipsy Moth .. .. .	807
Airisms from the Four Winds .. .. .	808
Bleriot Reminiscence .. .. .	809
Short Brothers' Sports .. .. .	810
Royal Air Force .. .. .	811
In Parliament .. .. .	811
Air Ministry Notices .. .. .	812
Personals .. .. .	812

## DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1929.	
July 16-27	7th International Aero Exhibition, Olympia.
July 25	Royal Aeronautical Society's Conversation and Wilbur Wright Memorial Lecture, at South Kensington Science Museum.
July 25	Bleriot Cross-Channel Flight Anniversary Fete, Calais.
July 28	International Flying Meeting, Sweden.
Aug. 1-14	French Light Plane Meeting, Orly.
Aug. 10	Air Pageant, Wythenshaw, Cheshire.
Aug. 15	International Balloon Race, Poland.
Sept. 6-7	Schneider Trophy Race, Solent.
Sept. 10-20	Aero Club de France Meeting, Le Baule.
Oct. 1	Gordon-Bennett Balloon Race, St. Louis, U.S.A.
Oct. 31	Guggenheim Safe-Aircraft Competition Closes.

## EDITORIAL COMMENT



The  
Do X.

THE chief topic of conversation where aviation folk foregather is at the present moment the new Dornier giant flying-boat, the Do. X, which has recently successfully passed its initial flying tests over Lake Constance. For several years opinions have been divided, not only in this country but also abroad, on the subject of the really large machine, one "school" holding that it is an irrefutable law of nature that, with increase in size, the weight increases as the cube of a linear dimension, while the area increases as the square, and that, therefore, one quickly reaches a size where the aircraft becomes uneconomical. This argument, while perfectly sound so long as one assumes "geometric similarity," is not, the other "school" maintains, valid as soon as one departs from "geometric similarity," and the whole argument concerning size really seems to boil down to the extent to which various parts of an aircraft follow the square law.

In the remarkable paper which he read before the Royal Aeronautical Society on April 26, 1928, Dr. Dornier dealt at some length with the subject, and pointed out that in certain components of a machine, such as in the hull of a flying-boat, not only does the hull weight not increase as the cube of a dimension, but actually it is roughly proportional to size. Here, it would appear, we have at once one very important and large item which helps the designer of a large flying-boat to "cheat" the fundamental law against which the producer of large aircraft is ever fighting.

An examination of the illustrations of the Do. X given in this issue indicates that, by arranging his engines in tandem pairs across a large portion of the wing, Herr Dornier has again managed to save a good deal of weight, owing to the distribution of load which this wing arrangement affords. The rest of the wing, from the outer pair of engines to the wing tip, is presumably subject to the square law handicap, but it appears that in hull and inner wing portion so much weight may have been saved as to outweigh this. At any rate, the "proof of the pudding is

in the eating thereof," and the Dornier "pudding" certainly appears to be at least an initial success. Not only has the machine flown, but it has proved to handle very well both on the water and in the air. Moreover, it has been taken off with but 8 of its 12 engines running, and its time to take off at a gross weight of 36.5 metric tons has been found to be only 25 seconds, a figure which it is hoped to reduce considerably when the pilot has had more experience of the machine.

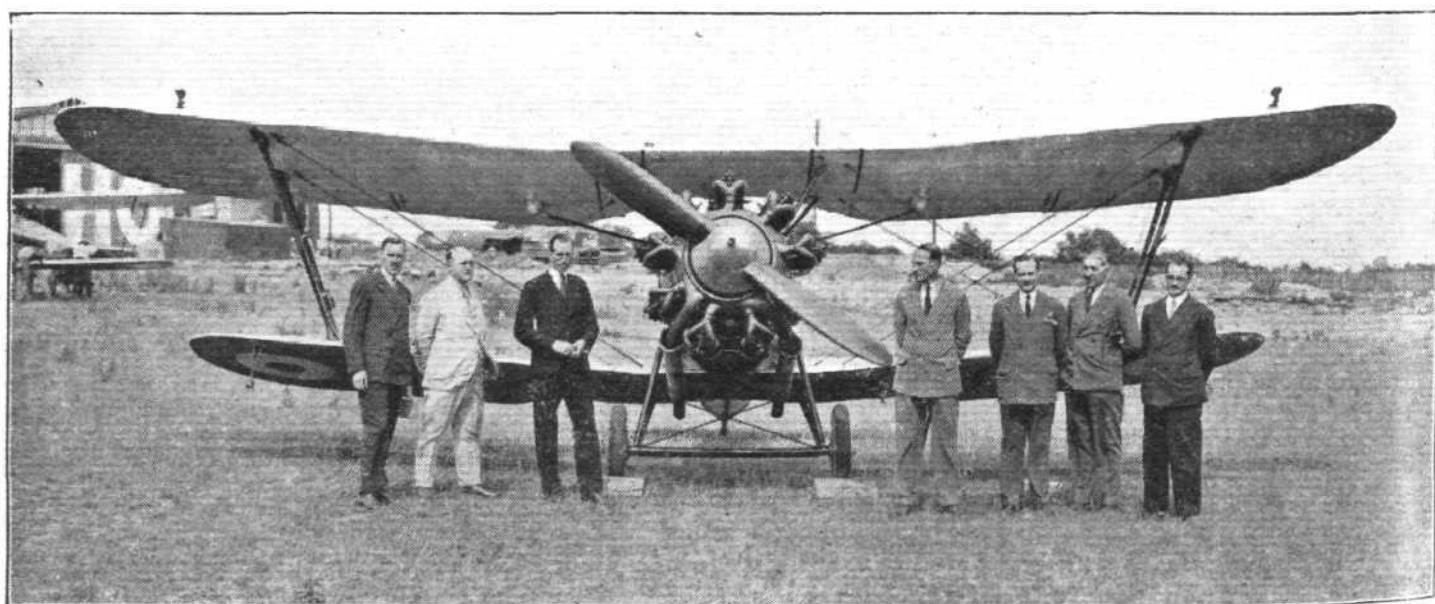
In his paper, Dr. Dornier gave the gross weight of the Do. X as 113,300 lbs., a figure which would represent approximately 55 metric tons. Thus, there is a long way to go yet before that figure is attained. Doubtless, during the next few weeks, trials will be made over Lake Constance with ever-increasing loads on board, and until the machine has actually got off and flown at a useful speed with this gross weight, one cannot fairly speak of the Do. X as being an unqualified success. The wing loading is believed to be in the neighbourhood of 22 lbs./sq. ft., while the power loading is approximately 19 lbs./h.p. Thus, with full load, the take-off speed and alighting speed will likely be in the neighbourhood of 80-90 m.p.h. The question of whether such minimum speeds are practicable in regular use still remains to be settled, but in the meantime, no one could withhold from Dr. Dornier and those associated with him the most unstinted admiration for the courage and initiative shown in producing this modern giant of the air.

To us in Great Britain, the future of the Do. X is of the greatest possible interest. No nation can have more to gain than we by the development and use of very large flying-boats. Our Empire air routes demands them, and if the type is proved possible of

achievement, we should lose no time in getting going. We know, of course, that fairly large boats are coming along, but nothing comparable with the Do. X is contemplated, as far as we are aware. And, quite frankly, we are not sorry that this is so. Herr Dornier may score an unqualified success. If he does, he will have deserved it thoroughly. On the other hand, he may not. There are a number of problems awaiting solution, in addition to the purely technical ones. For instance, in no type of machine does size, as such, have any particular advantage, with the one exception that, in the case of a flying-boat, seaworthiness is a relative term, and largely depending upon size. That, of course, is a very great point in favour of producing large flying-boats. But it still remains to be seen whether the Do. X is any more seaworthy than are some of the much smaller British flying-boats.

The argument for the large machine sometimes advanced, that it is more economical to operate because more passengers can be carried for a crew of given size, is, it seems to us, a somewhat doubtful one. So long as the machine is filled to capacity on every flight, doubtless the argument is sound. But suppose a machine designed to carry, for example, 100 passengers, can only be half filled on many of its flights; will anyone claim that such a machine is then a very economical proposition? Frankly, we doubt it.

In this matter of size, although we have an open mind and are prepared to be convinced that, in flying-boats at any rate, there exist possibilities of "cheating" the square law, we do feel that it is wise to make haste slowly. We yield to no one in our admiration of the work done by Dr. Dornier, but, to use an American slang expression, "we are from Missouri."



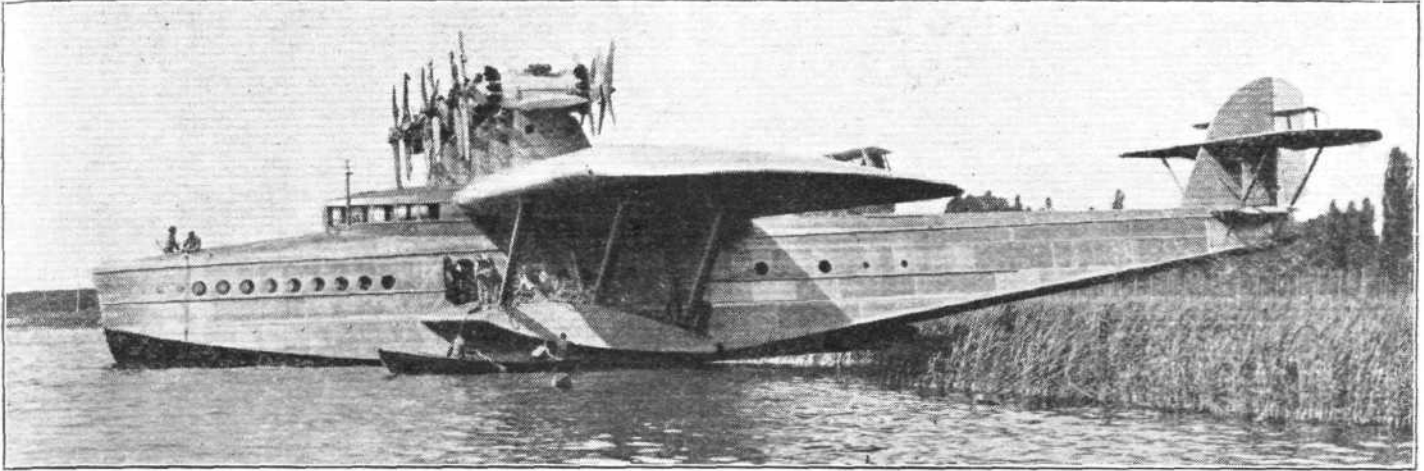
**DISTINGUISHED VISITORS AT FILTON:** On July 17 the Bristol Aeroplane and aero engine works were visited by the Infante of Spain and M. Robert Esnault Pelterie, one of the pioneers of French aviation. The Infante, who is one of the finest Spanish pilots, made a flight in a Bristol "Bulldog," and made a perfect three-point landing. In the photograph are seen, on the right, from left to right: Don Alfonso, Senor Carlos de Quiros, Mr. C. F. Uwins, and M. Robert Esnault Pelterie.



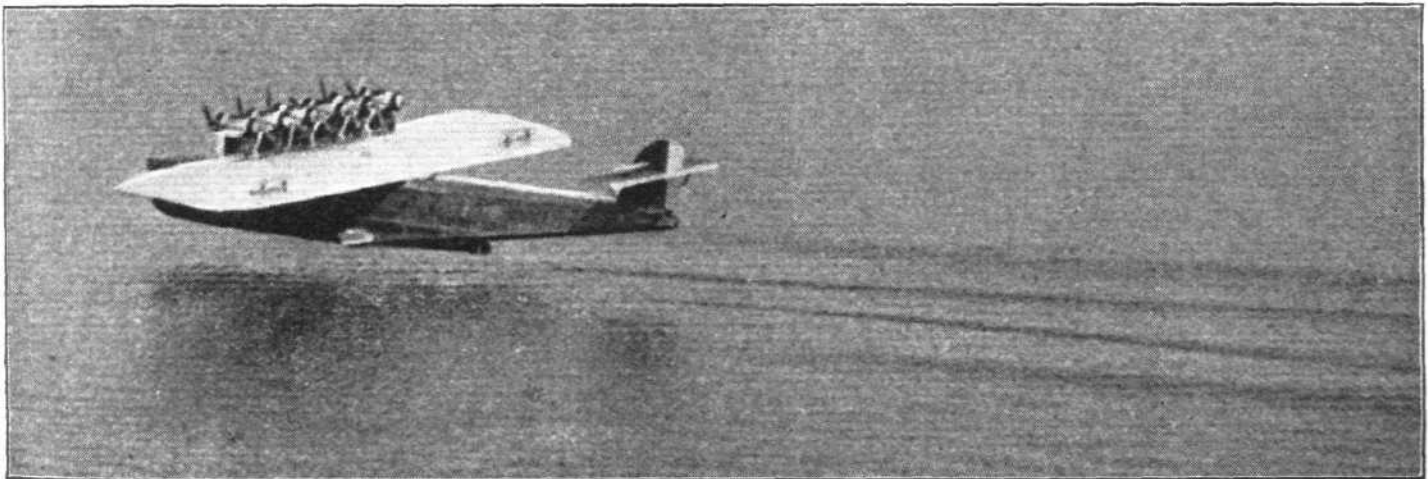
## THE DO. X TAKES THE AIR

**W**ITHOUT a doubt, the greatest recent event in the world of aviation was the launching and first successful flights of the giant Dornier flying boat type Do. X, about which rumour has been busy for many months, but

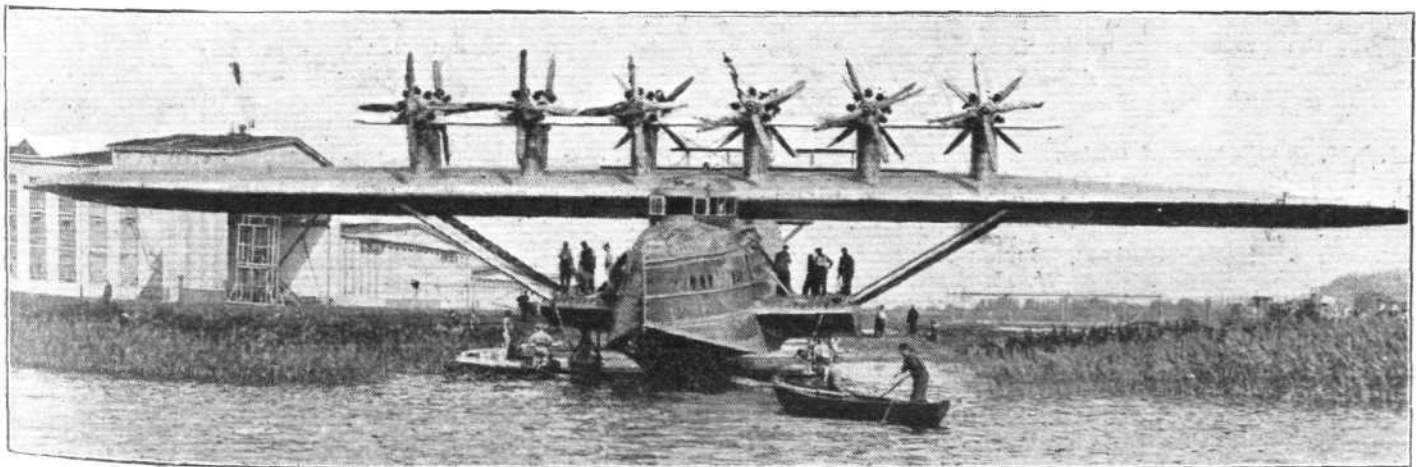
At last the Do. X is a *fait accompli*, and although it would be full early to speak of the machine as an unqualified success, the first tests flights appear to have indicated that not only will the machine get off under suitable conditions, but that



**LAUNCHING THE WORLD'S LARGEST FLYING-BOAT:** The 12-engined Dornier Do. X leaving its slipway. Scale is given to the picture by the people standing on the lower wing roots.



**THE FIRST FLIGHT:** The Dornier Do. X leaving the water for the first time.

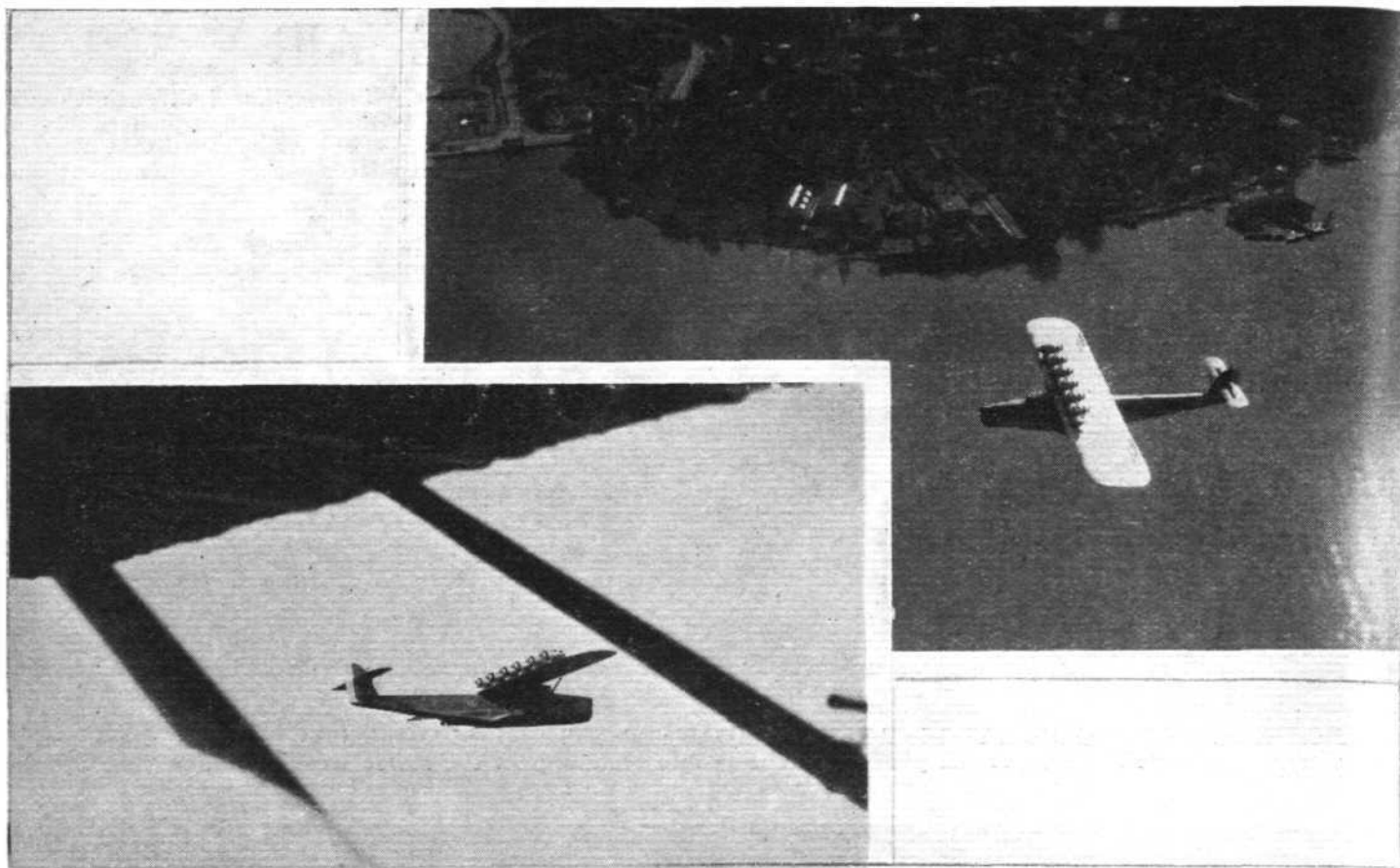


**JUST BEFORE THE LAUNCH:** The Dornier Do. X on the slipway. Note the tandem arrangement of the "Jupiter" engines.

about which relatively little has been permitted to become known, although its designer, Herr Claudius Dornier, did give a few particulars of the machine in the memorable paper which he read before the Royal Aeronautical Society last year.

its behaviour on the water and in the air are perfectly normal, and under the absolute control of the pilot. That is already a good deal, and Herr Dornier and those associated with him are to be congratulated most heartily on having achieved, at the very least, an initial success.





IN FULL FLIGHT: The Dornier Do. X photographed from another aeroplane flying over Lake Constance

From the Dornier works at Friedrichshafen, we have received the following information concerning the earlier flights with the Do. X. On July 12, the launch of the Do. X took place in the presence of Herr Dr. Dornier and a few of his colleagues. By means of the special electric trolley constructed for the purpose, it was possible to bring the machine out of its shed and run it down the slipway and into the water in a few minutes, the trolley being operated by one man only. After a short test of the engines, the pilot proceeded to make a number of tests of the handling of the machine on the water, and as these were found to give satisfactory results, and to be equal in every way to similar tests of smaller Dornier machines, short straights were made, again with satisfactory results. Already on the first day three flights could be made, and since then the machine has been flown two or three times daily.

As a result of the first tests, the following conclusions have been arrived at: All 12 "Jupiter" engines can be started within a period of less than 7 mins. During the first test flights the machine got off in 25 secs., and this time was

not increased when, later, the machine was taken off at a gross weight of 36.5 metric tons. This indicates, it is thought, that when the pilot has had more experience, he will be able to shorten the time to take off, and also indicates that the machine will get off with full load. The run after alighting is remarkably short.

More recently, the experiment has been made of taking the machine off with two of the 12 engines stopped, and this proved quite feasible. That being the case, an attempt was made next to take the machine off with only eight engines running, and also this was a success. The tests are now being continued, and will shortly include full-load tests, performance tests, and test of the manoeuvrability, etc. Of these we hope to have more to say as soon as the results become available.

During the early test flights, the Italian Under-Secretary of State for Air, Signor Balbo, arrived at Friedrichshafen, and not only witnessed some of the flights, but actually made a flight in the Do. X, the second of which has been ordered by the Italian Government.



#### H.R.H. the Prince of Wales

THE Prince of Wales left Hendon Aerodrome on July 23 in a R.A.F. machine piloted by Sqdn.-Ldr. D. S. Don, and escorted by another machine. An hour later the Prince landed on Bass's Meadows, Burton-on-Trent, where the Mayor of Burton (Councillor W. H. Giles) and the Earl of Harrowby, Lord-Lieutenant of Staffordshire, greeted his Royal Highness.

At the civic luncheon in the Town Hall the Mayor referred to the Prince's interest in flying, which was bringing business centres closer together, and said that they regarded Burton as an excellent situation for an air port. The Prince's visit was on the occasion of the town's jubilee celebration. He inspected the Pirelli tyre factory, and started one of the biggest calenders in the country for the mixing of rubber and canvas. Eight hours after leaving Hendon the Prince of Wales landed there on his return.

#### Small Vessels at the Schneider Trophy Contest

At the request of the King's Harbour Master, Portsmouth, the Royal Aero Club makes the following announcement regarding anchorages at the Schneider Trophy Contest, September 7:—

Small craft drawing less than 8 ft. of water may anchor in any of the following areas, which have been reserved for

them: Bramble, Browndown, Hayling, Horse Sand, Mother Bank, Wootton, and West Middle to the East of West Ryde Middle Light Buoy.

The details of these areas are shown on a published chart which can be obtained from the Secretary, Royal Aero Club, 3, Clifford Street, London, W.1, the prices of which are 8s. 6d. for one of large size, and 2s. for a smaller chart, post free. Further details and instructions to be observed by all vessels will be published at a later date.

#### Schneider Competitors

It is learned unofficially that France and America are not likely to compete in the Schneider Trophy contest in September, in which case Italy will then be Great Britain's only competitor.

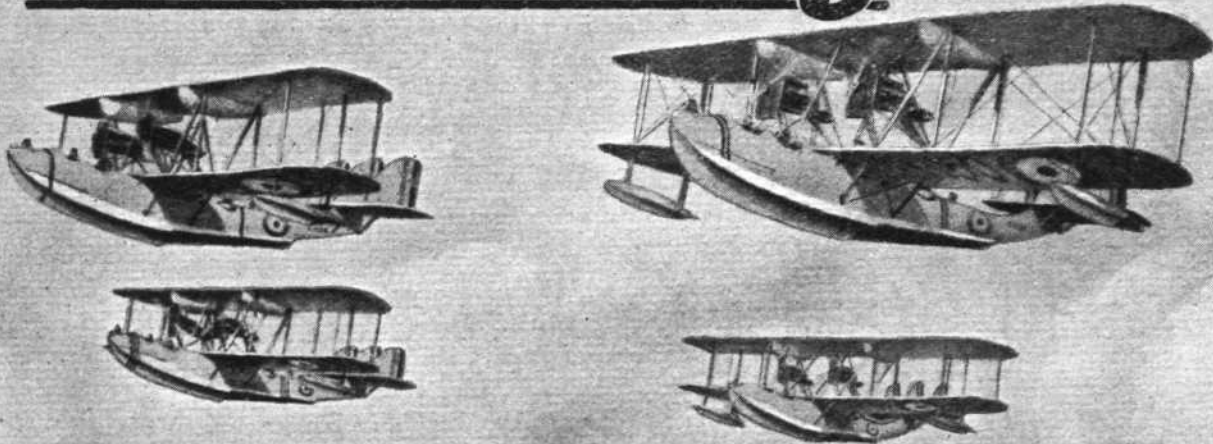
#### New Chairman of the Royal Aero Club

SIR PHILIP SASSOON has been elected as Chairman of the Royal Aero Club in succession to the Right Hon. Lord Thomson, who is now Secretary of State for Air.

#### Civil List Pension

In the list of people granted Civil List pensions during the year which ended March 31 last, is Mrs. Agnes Mary Weiss in recognition of the pioneer services rendered to aviation by her late husband, Joseph Vincent Weiss.

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One of the "Southampton" flying boats that took part in the Far East Flight  
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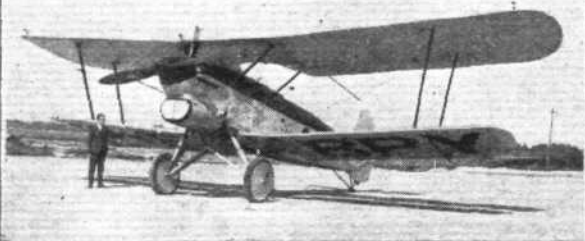
*Vickers "Type 143" Single Seater Fighter.*



*Vickers "Vespa" Two-Seater for Military Reconnaissance.*



*Vickers "Vivid" Military Two Seater.  
Napier Lion XI Engine.*



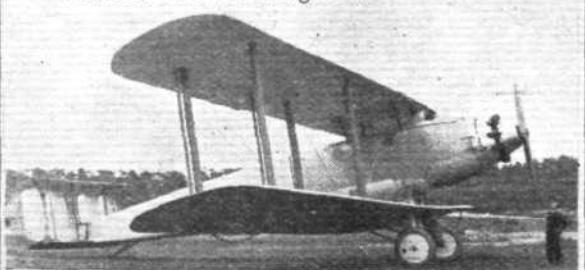
*Vickers "Vivid" Seaplane.*



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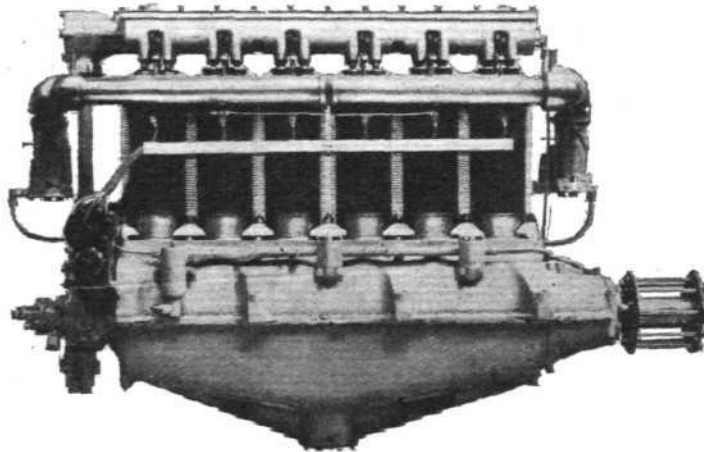


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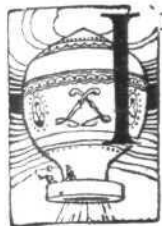
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# Leaves from our Sketch Books



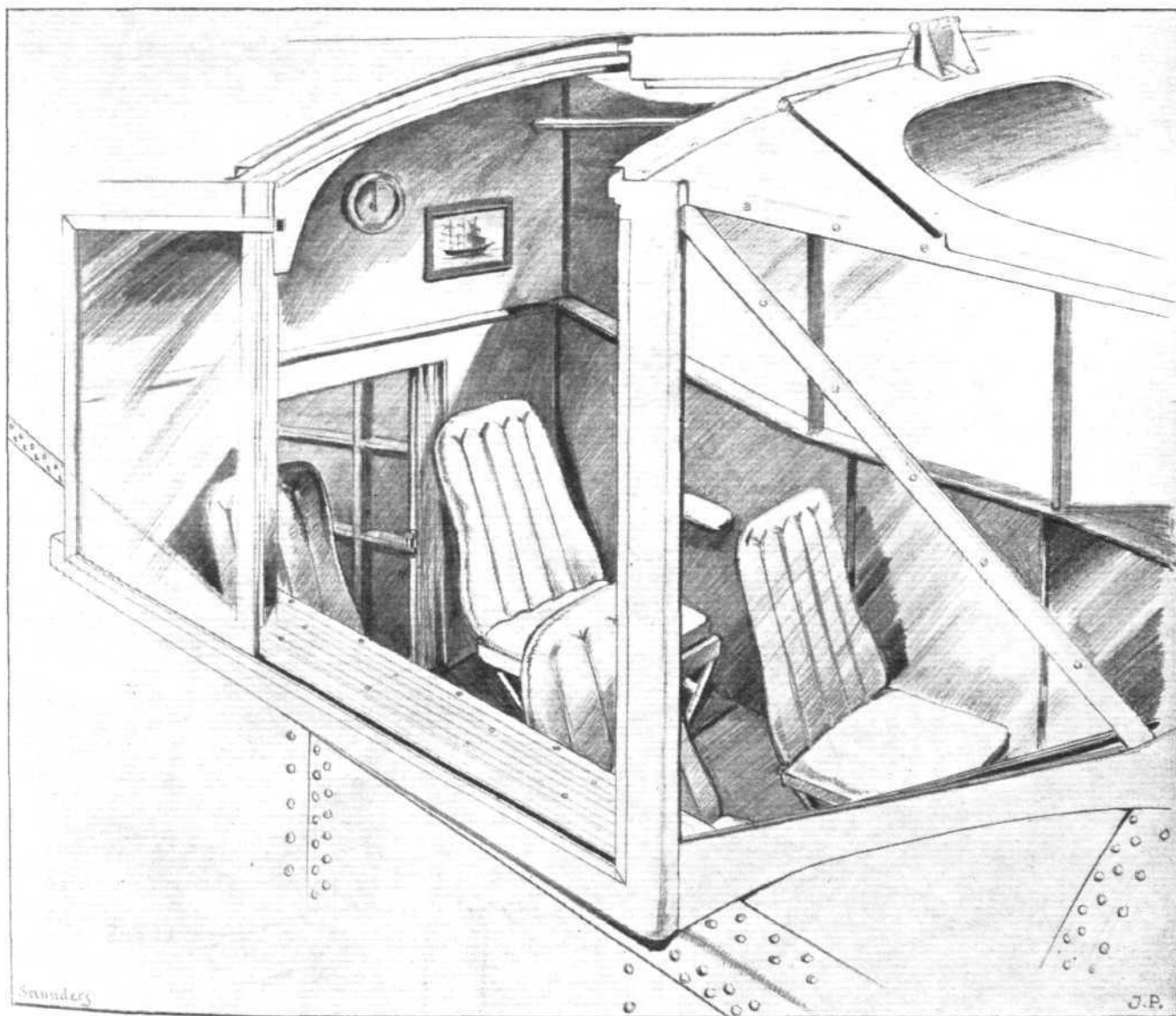
IN our issue of July 11 we published illustrated descriptions of all the British aircraft exhibited at Olympia, and on July 18 we gave illustrated descriptive articles dealing with all the British aero engines and of the foreign aircraft to be seen at the show. Thus in a measure those two issues of FLIGHT gave readers particulars of all the more important exhibits with the exception of the aero engines exhibited by foreign constructors. Particulars of all the foreign aero engines will be found in the present number of FLIGHT, with photographs of most types, while in two tables on pp. 777-778 are summarised the main engine data, foreign as well as British.

Particulars of a vast number of accessories, components and equipment will also be found in the present issue, on pp. 779-795, and for the benefit of those of our readers who have not been able to visit Olympia, and who have not, therefore, been in a position quite to get the "atmosphere" (we are not referring to the results of the "heat wave") of the finest aero show ever held in Europe, we publish in the following pages some rather lighter fare in the form of sketches

and photographs. We hope these pages will enable readers unable to visit Olympia to visualise to some extent what this great show is like, and what a variety of interesting machines are collected under the roof of Olympia.

In the following pages will be found a number of sketches obtained by FLIGHT artists on the actual stands at the exhibition, and as these are merely meant to illustrate interiors or exteriors of special interest, or certain unusual features of machines, no attempt has been made to give an alphabetical arrangement. In other words, we have not, in these pages, been concerned with compiling a "catalogue." Rather would we ask our readers to regard the following pages as more or less random impressions by FLIGHT's artists.

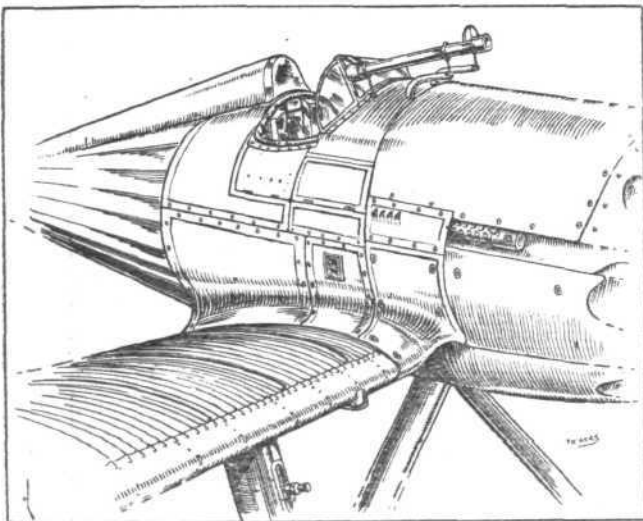
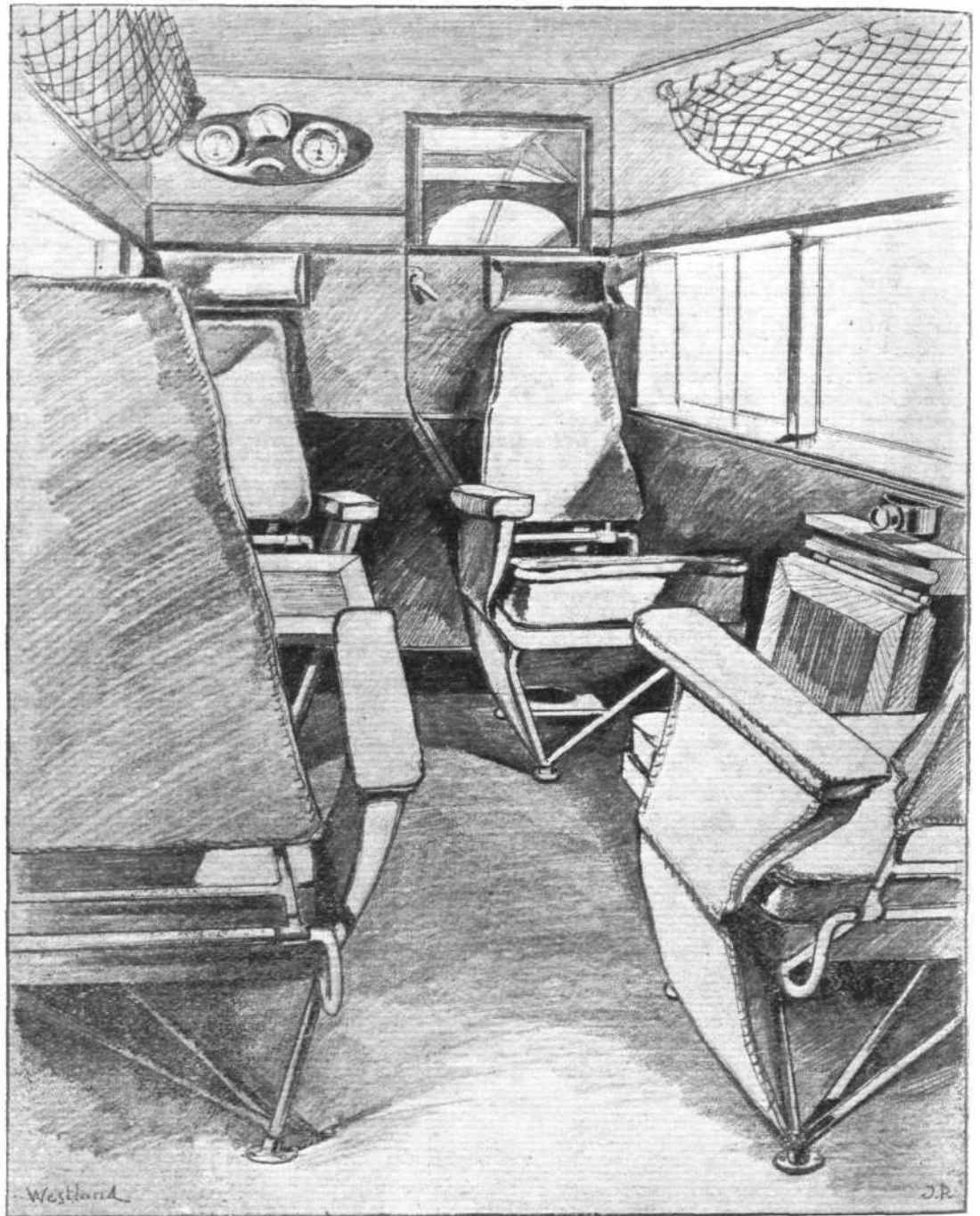
Much the same applies to the pages of photographs of the various aircraft stands, in which again we have not attempted to keep to any strict alphabetical order, this being in any case impossible on account of the unyielding and inelastic nature of type and half-tone blocks! For all that, we believe that our readers will like to see what the various stands look like, the more so as the illustrations given in our July 11 issue were mainly concerned with details of the internal structure of the machines rather than with external appearances.



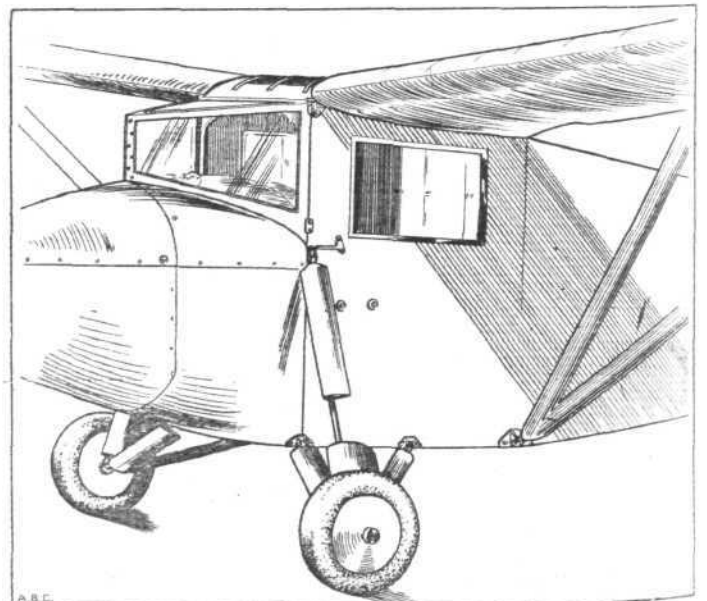
A REAL "AIR YACHT": The Saunders "Cutty Sark," a flying-boat with two "Hermes" engines, has a four-seater cabin of quite exceptional comfort. Situated ahead of the engines, the noise which reaches the occupants is not offensive, and the transparent covering all round results in a very light and airy cabin. ("FLIGHT" Sketch.)



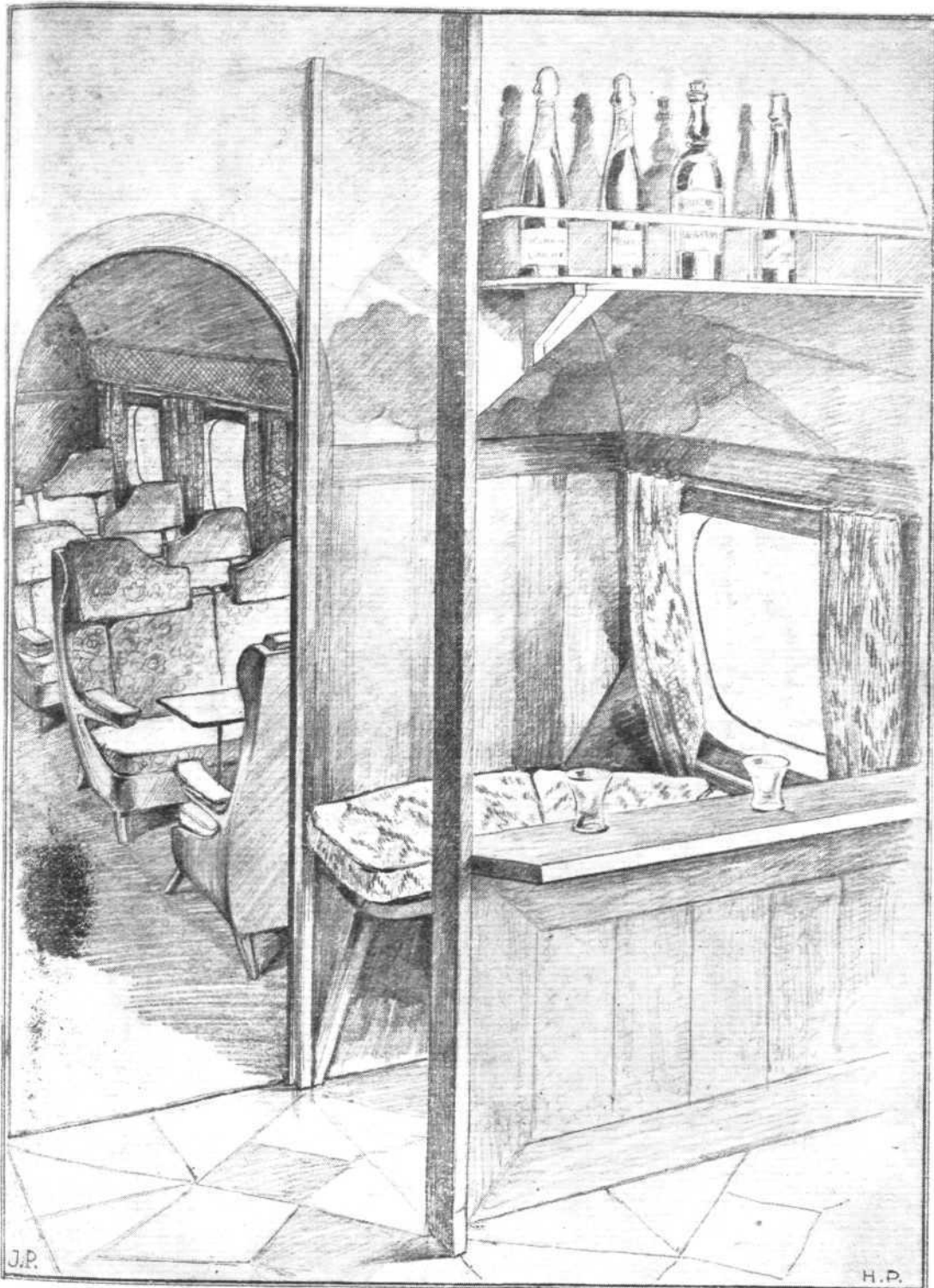
IN the cabin of the "Westland IV" three-engined limousine some of the passengers face forward and some aft. A door in the forward wall gives access to the pilot's cockpit. ("FLIGHT" Sketch.)



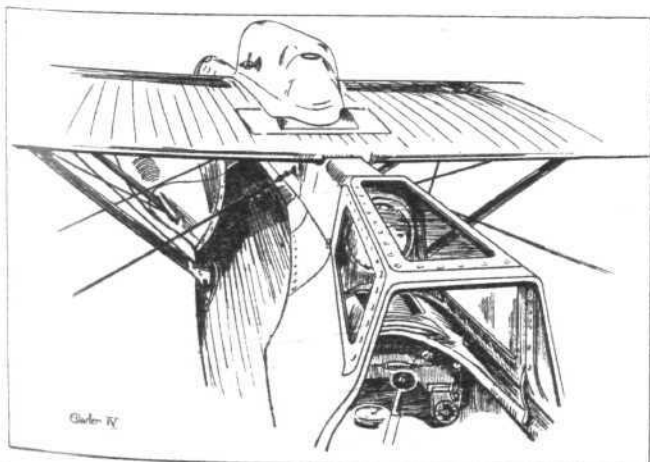
The wing roots on the Vickers single-seater fighter are carefully faired into the fuselage. Note the very unobstructed view for firing. ("FLIGHT" Sketch.)



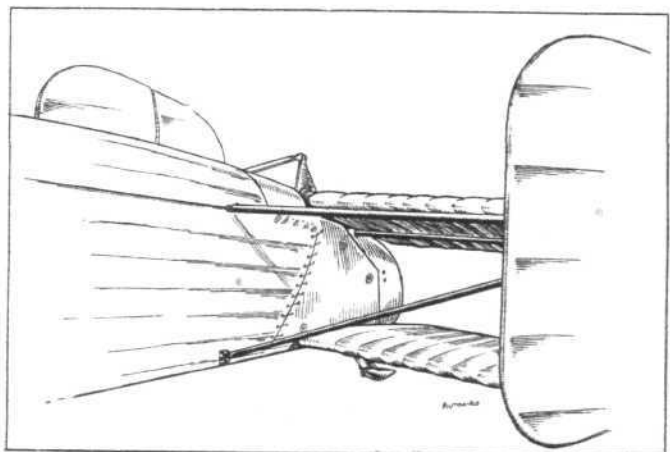
The A.B.C. "Robin" has its little enclosed cabin for the pilot and sole occupant. ("FLIGHT" Sketch.)



FEW visitors to Olympia realise that the cabin of the large Handley Page four-engined machine is but an elaborate "mock-up," the actual all-metal fuselage not being ready for the Show. This view shows the cabin, bar, etc. ("FLIGHT" Sketch.)

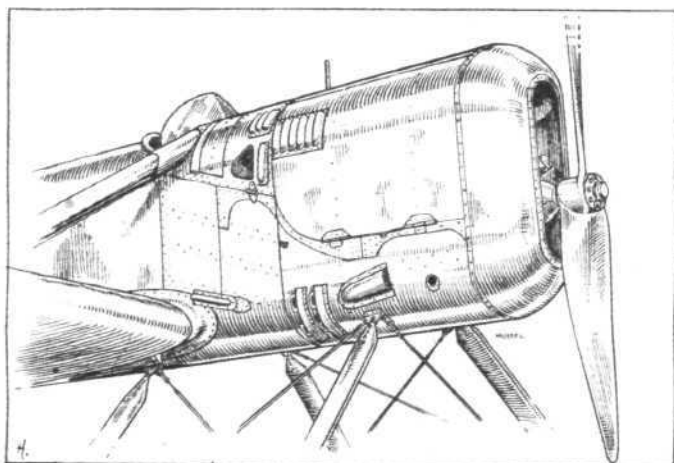
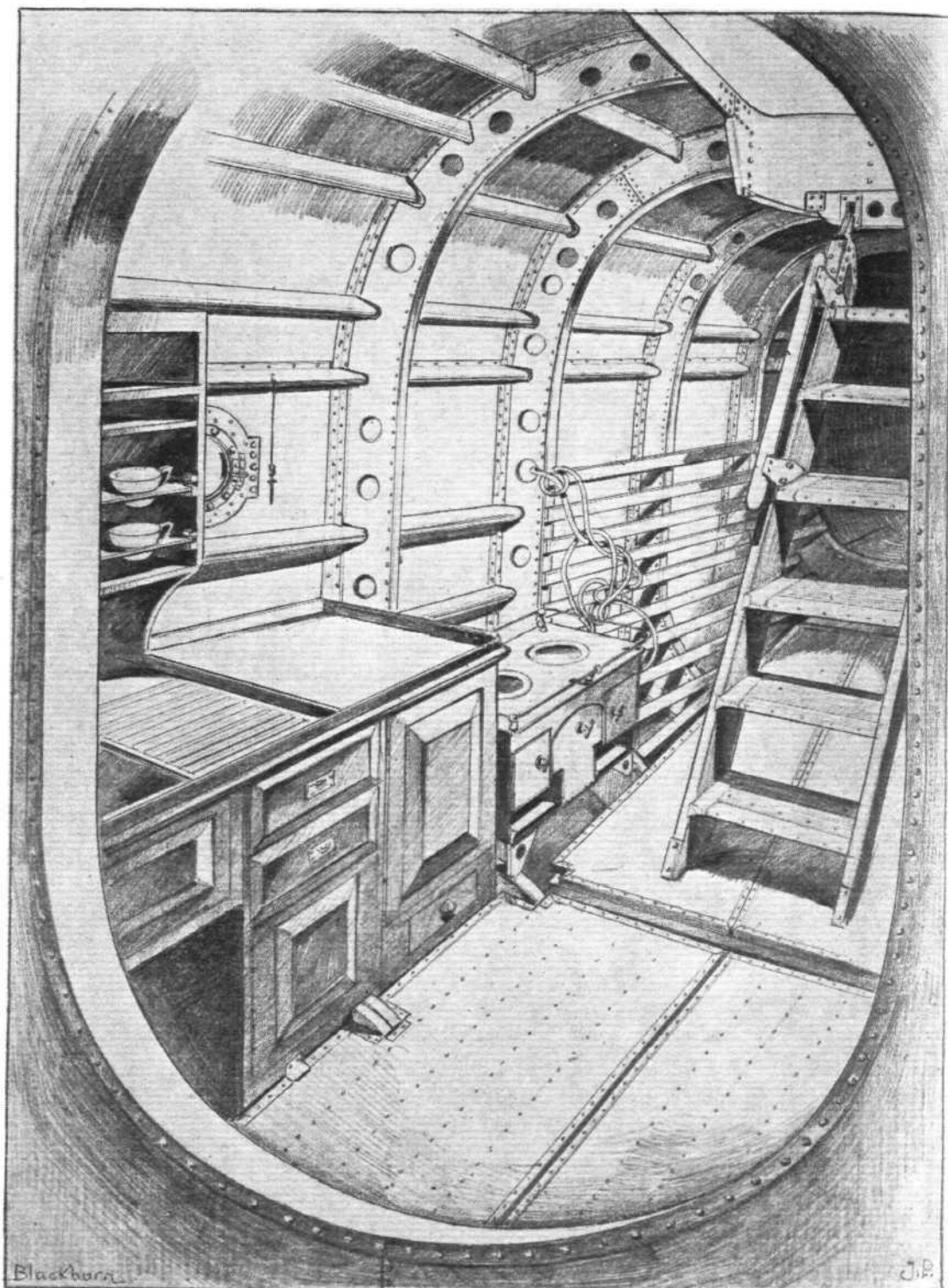


This sketch illustrates the special type of windscreen which is used to protect the pilot from the force of the terrific air stream in the Gloster IV. ("FLIGHT" Sketch.)

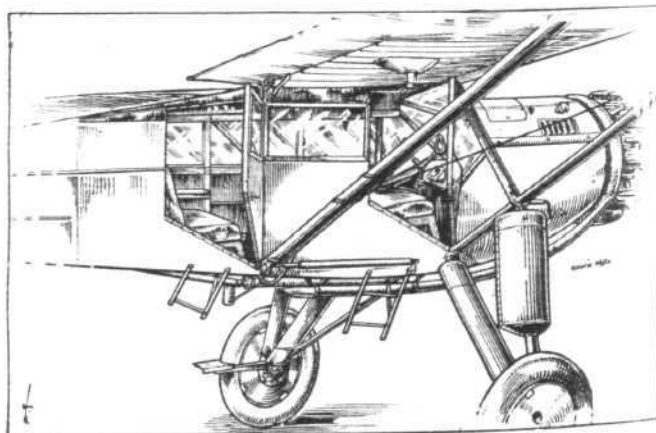


The biplane tail on the Cierva "Autogiro." By tilting the horizontal surfaces upwards they can be made to act as deflectors, and thus assist in starting the rotor. ("FLIGHT" Sketch.)

A PEEP into the immediate future is afforded by the interior of the Blackburn "Nile" flying-boat hull, in which, in addition to the usual seating accommodation for passengers, there is a canteen with stove and complete equipment for serving meals while the machine is in flight. ("FLIGHT" Sketch.)

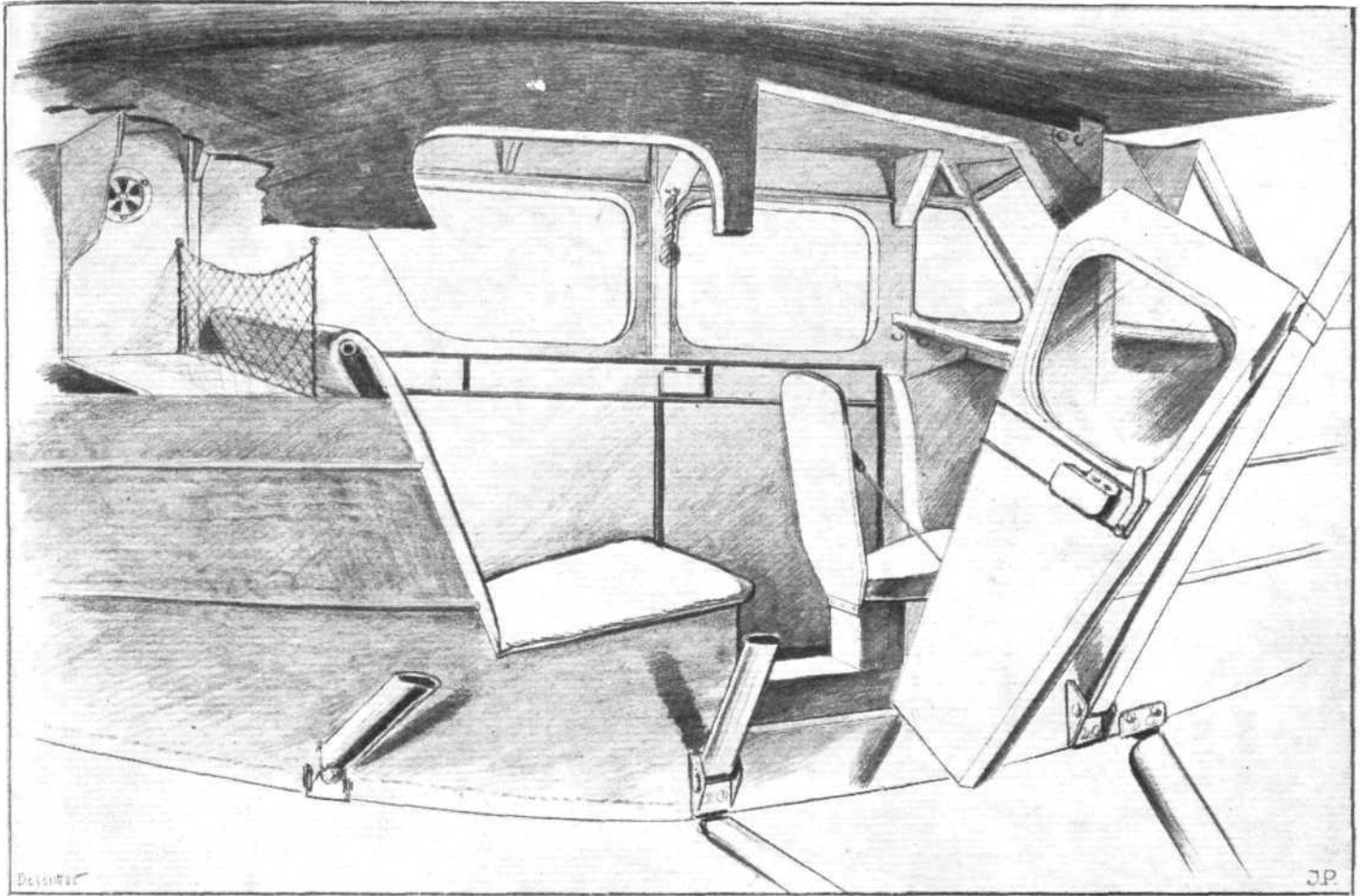


The nose of the Short "Mussel" is particularly "clean," and low air resistance is obtained without interfering with the cooling of the engine. ("FLIGHT" Sketch.)



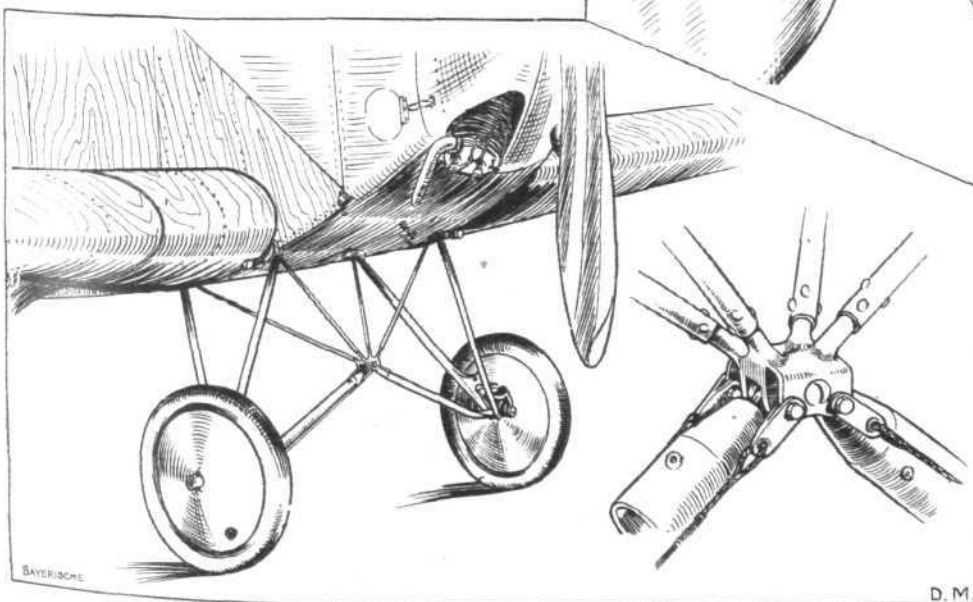
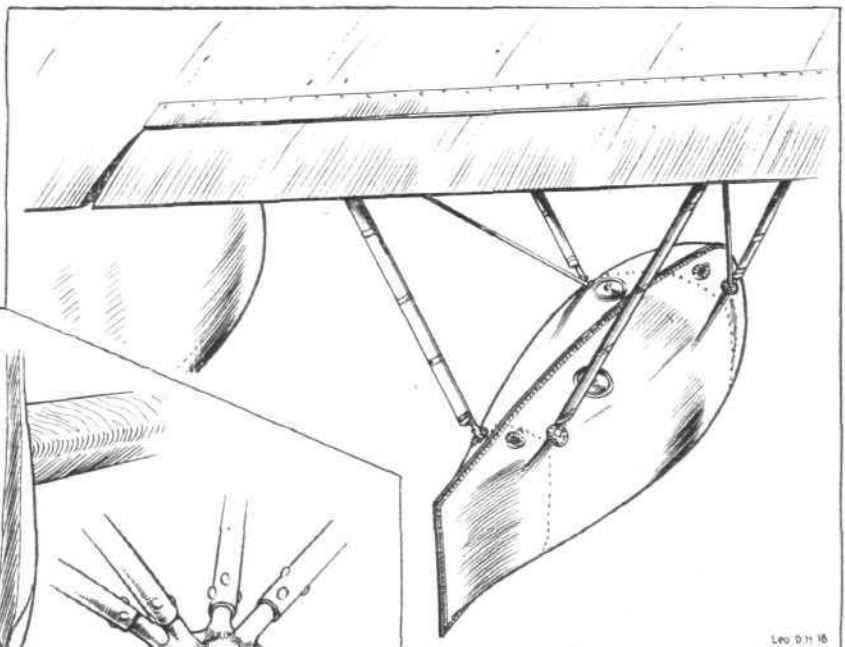
In the de Havilland "Hawk Moth" the pilot sits on the left, with one of the passengers beside him and the other two behind. ("FLIGHT" Sketch.)



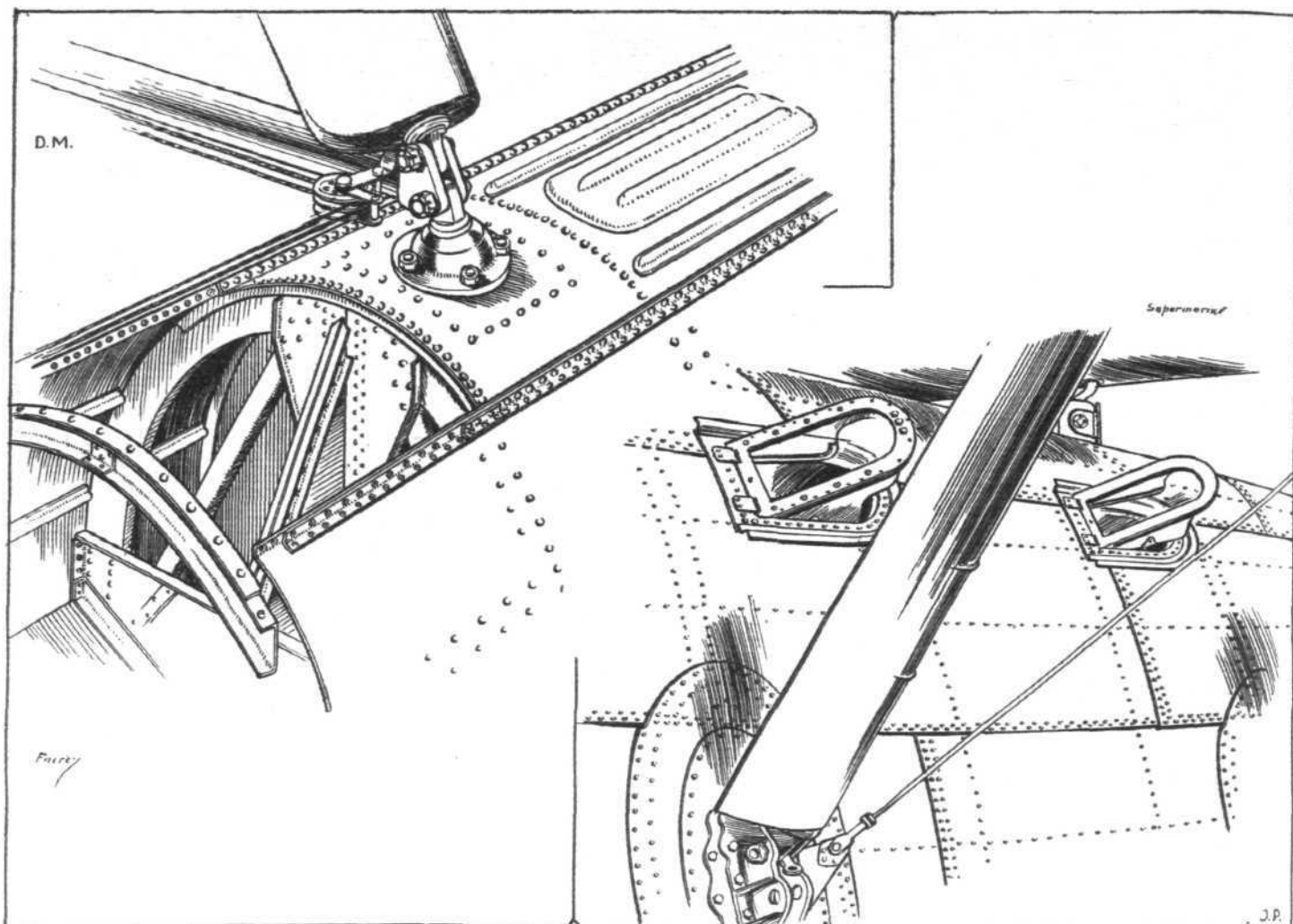


The Desoutter Sports coupé has seating accommodation for pilot and two passengers. Although simply a "deck chair" type, the passengers' seat is one of the most comfortable in the whole Show. ("FLIGHT" Sketch.)

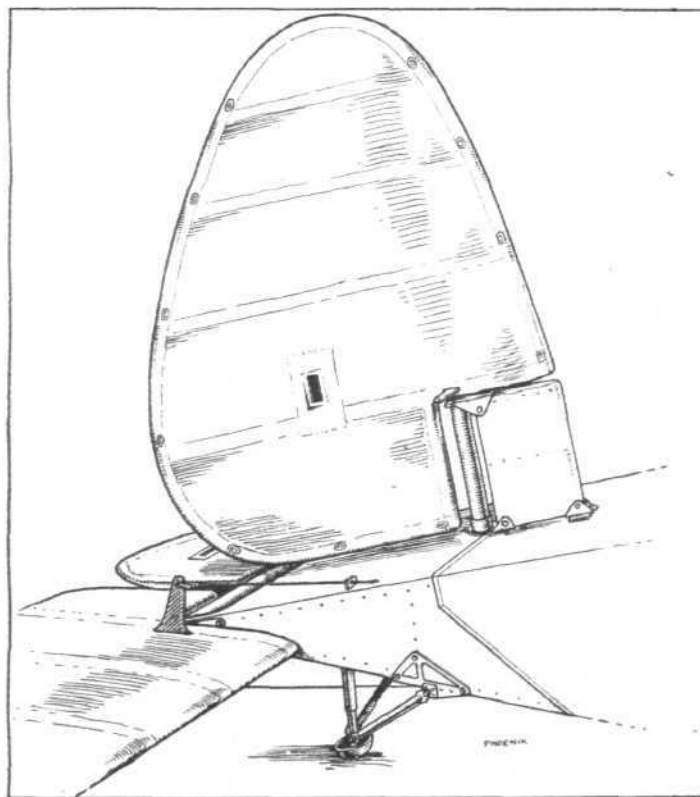
The smallest flying boat in the Show is the Liore & Olivier Leo H.18, which is a two-seater suitable for school work or as a private owner's machine. The sketch on the right shows one of the outboard wing floats. ("FLIGHT" Sketch.)



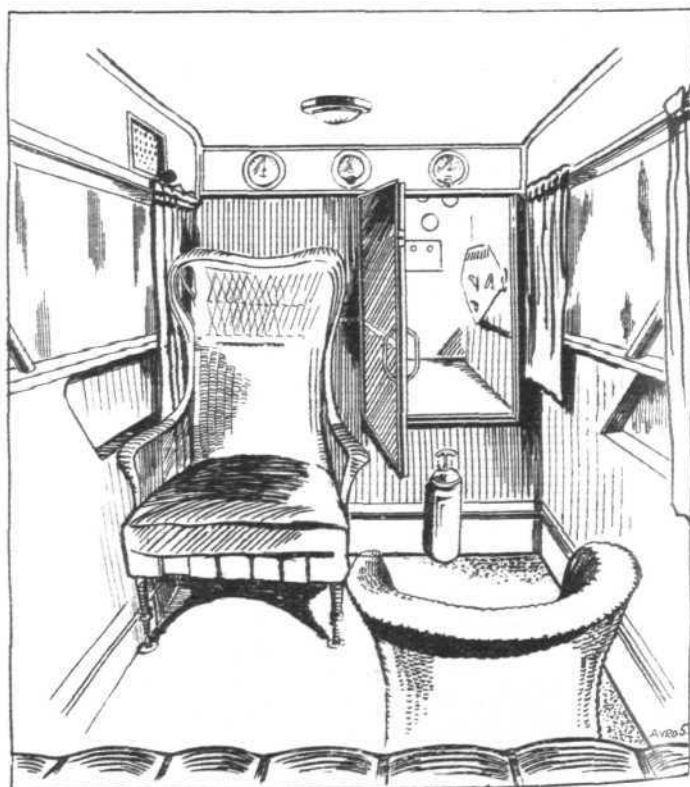
On the B.F.W. M.23 a split undercarriage is used, with the bent axles hinged to a pyramid from the bottom of the fuselage. ("FLIGHT" Sketch.)



Details of the construction of Fairey duralumin floats are shown on the left. Special ventilators are used on the Supermarine "Southampton" flying-boats which made the 27,000 miles' flight to Australia and back to Singapore. ("FLIGHT" Sketches.)



The Boulton and Paul "Phoenix" has an unusual tail arrangement whereby the rudder is identical with each elevator flap. This reduces the number of spares. ("FLIGHT" Sketch.)



In the Avro 5 there is seating accommodation for five passengers, three in the back seat and one in each of the two arm-chair seats. The door communicates with the pilot's cockpit. ("FLIGHT" Sketch.)

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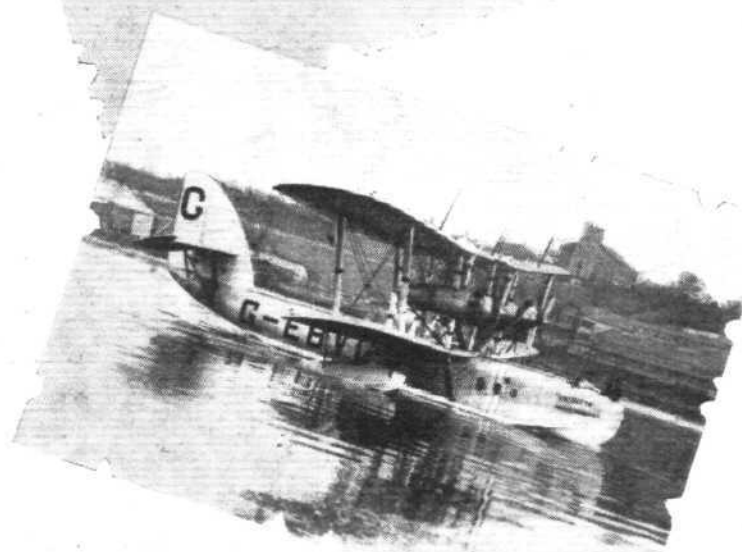
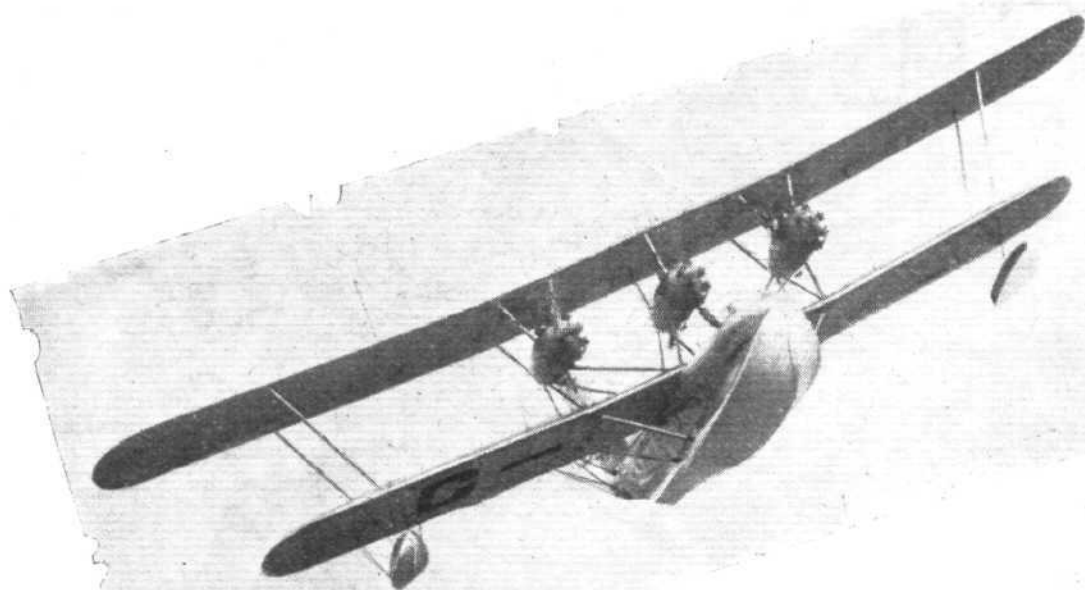
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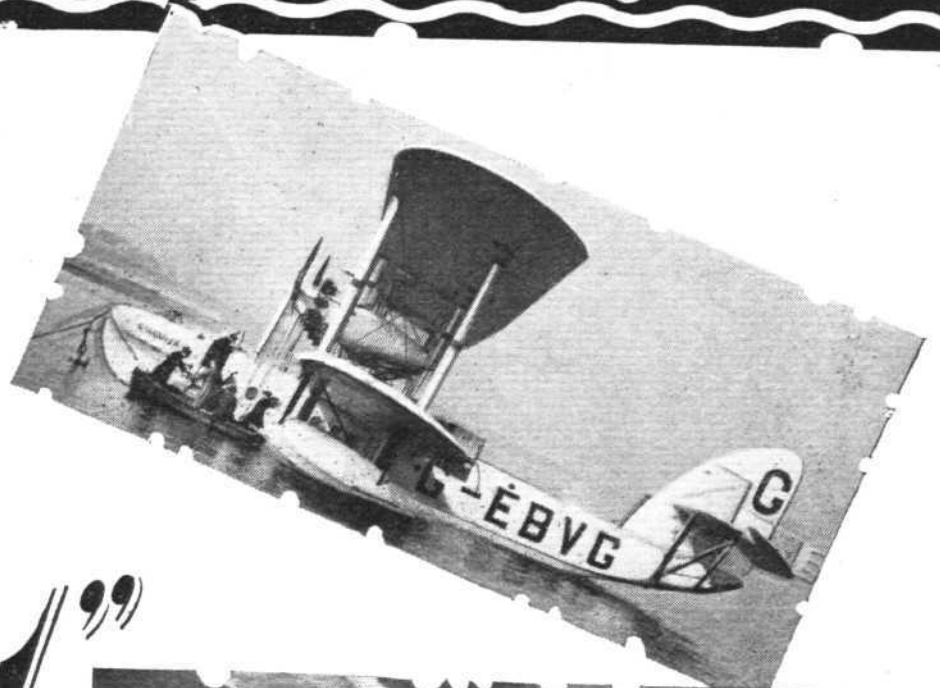
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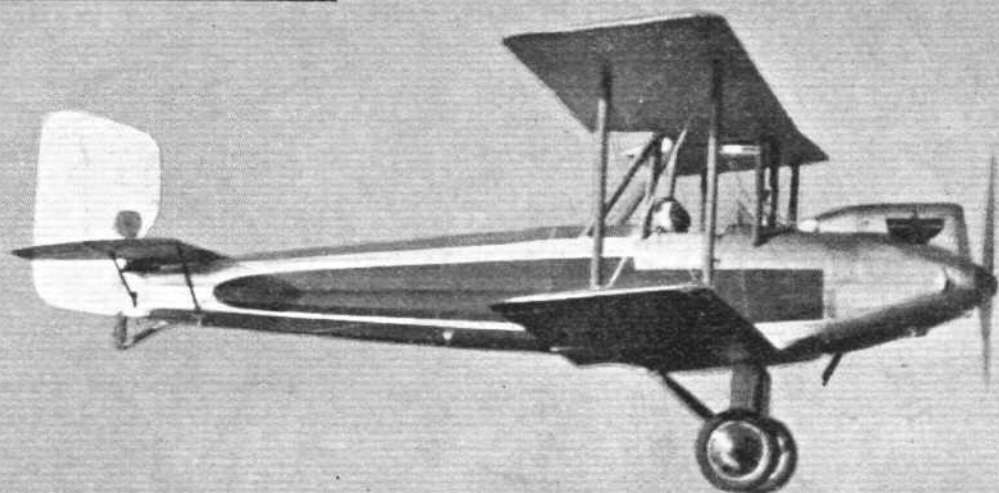
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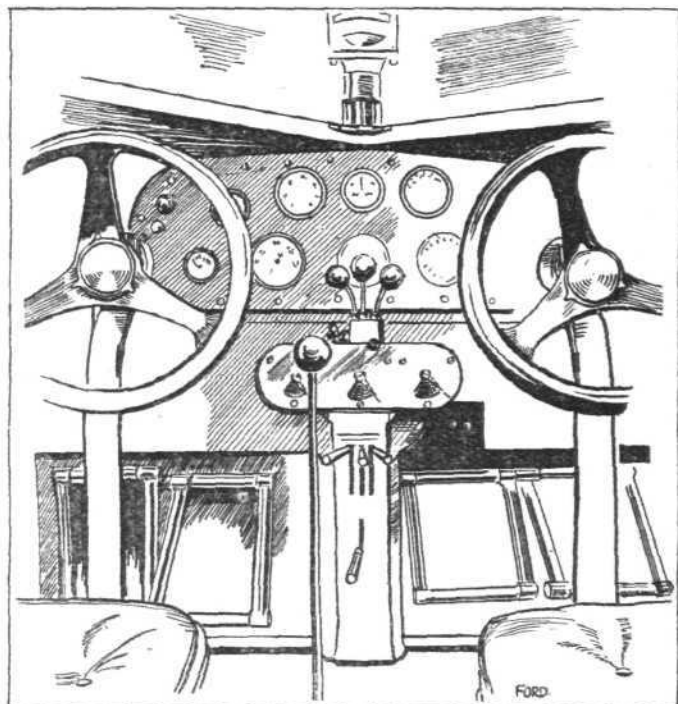
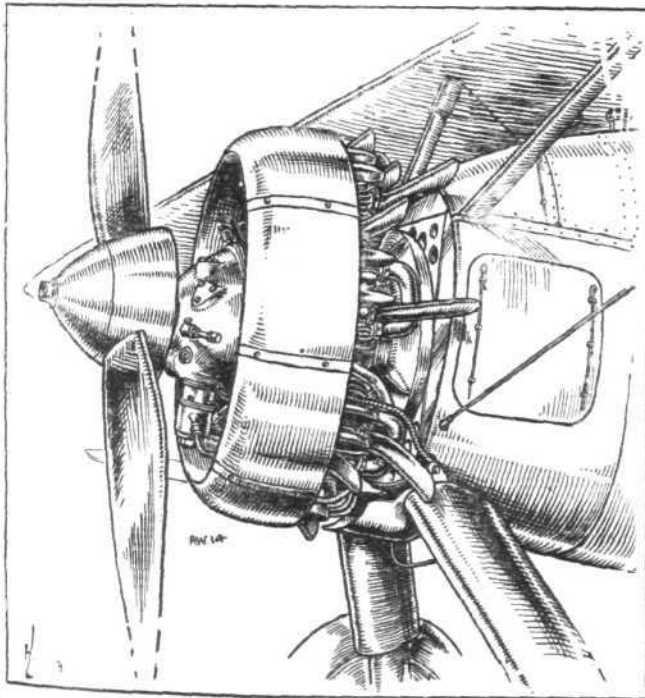
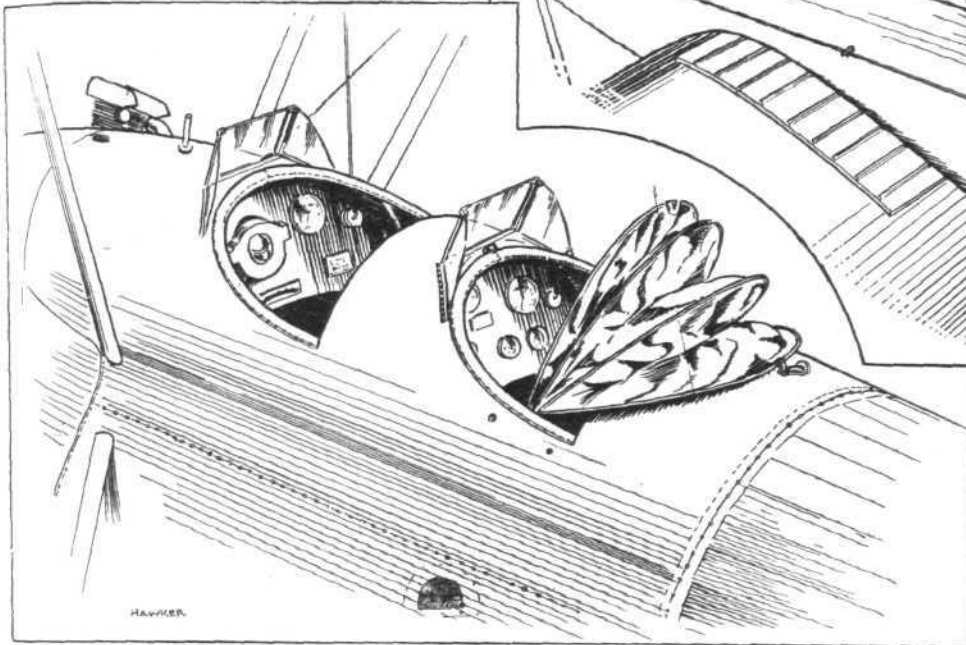
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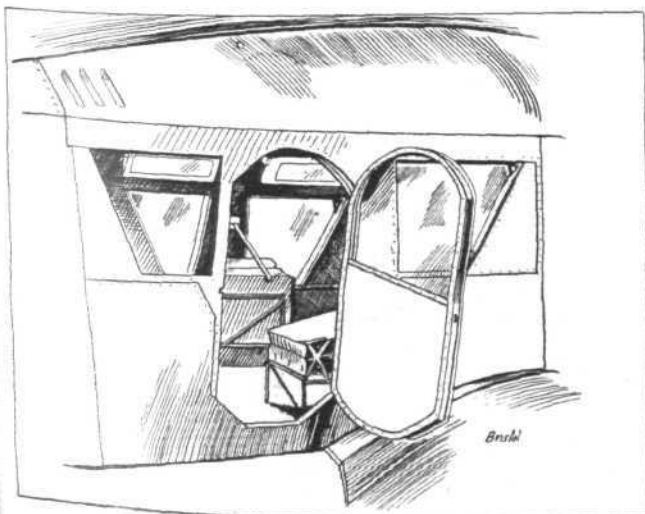
Below is shown the folding hood of the Hawker "Tomtit," which is used for training pilots in flying entirely "by instruments."  
("FLIGHT" Sketch.)



Above, cockpit and luggage compartment (with lid open) of the Glenny & Henderson "Gadfly" single-seater light plane. ("FLIGHT" Sketch.)



Among the firms who have done a lot of experimental work with the "Townend ring" is Sir W. G. Armstrong-Whitworth Aircraft, Ltd., whose A.W. XIV is shown above on the left. On the right, a view inside the cockpit of the trimotored Ford, showing dual controls and hydraulic brake handle. On the left, a view through the door in the cabin of the Bristol 110A. The front seats fold up into a small space. ("FLIGHT" Sketches.)

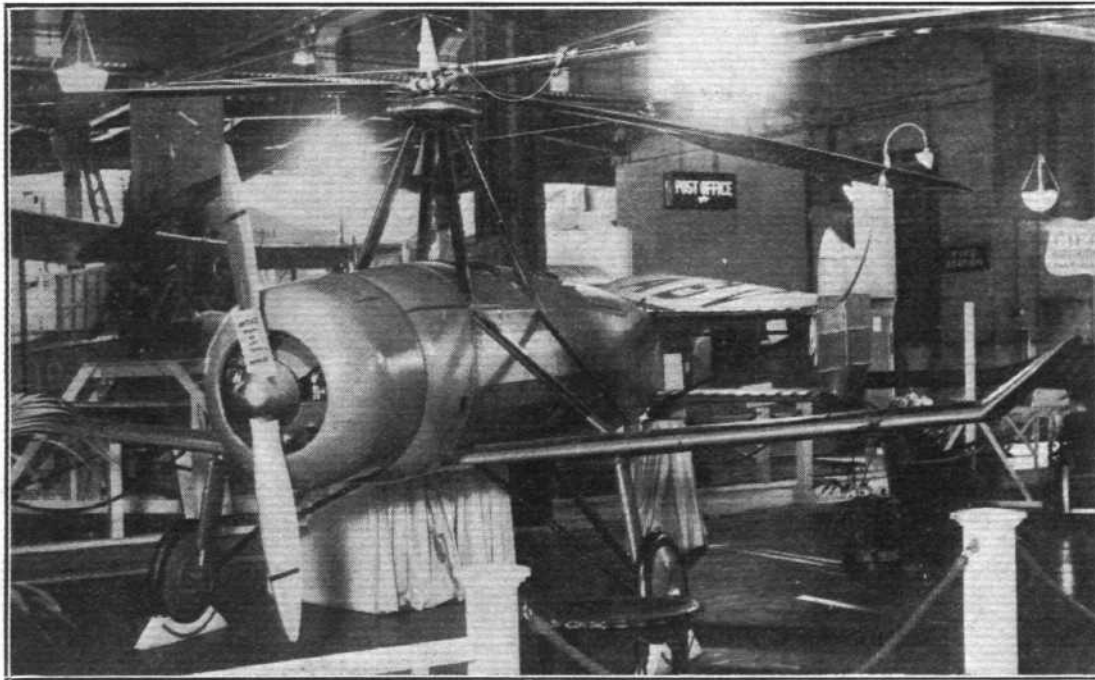
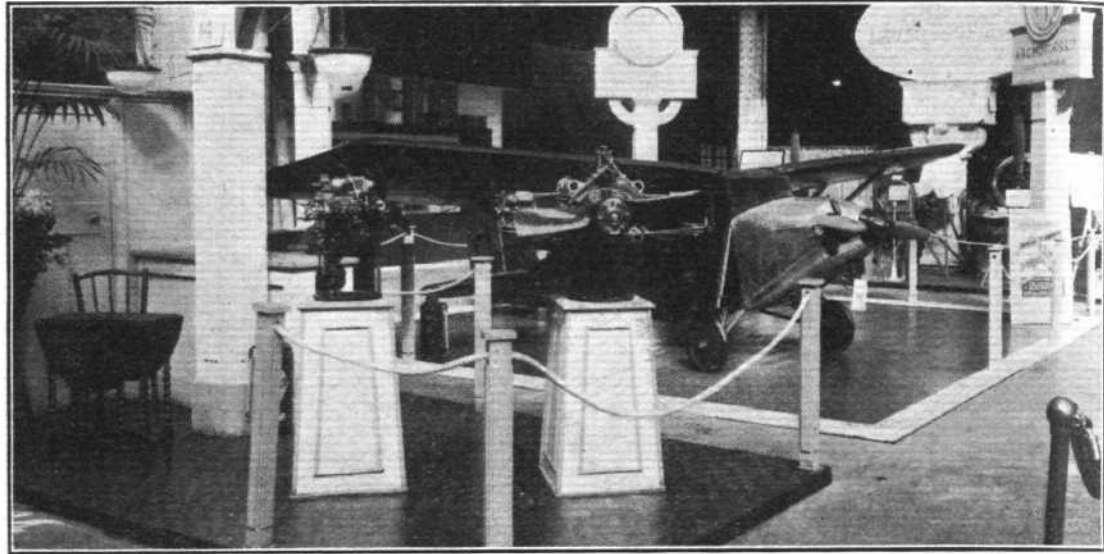


# OLYMPIA

## SOME OF THE STANDS

The A.B.C. Stands : In the foreground are seen the two engines, "Scorpion" and "Hornet," and behind them the little "Robin" light 'plane.

("FLIGHT" Photo.)

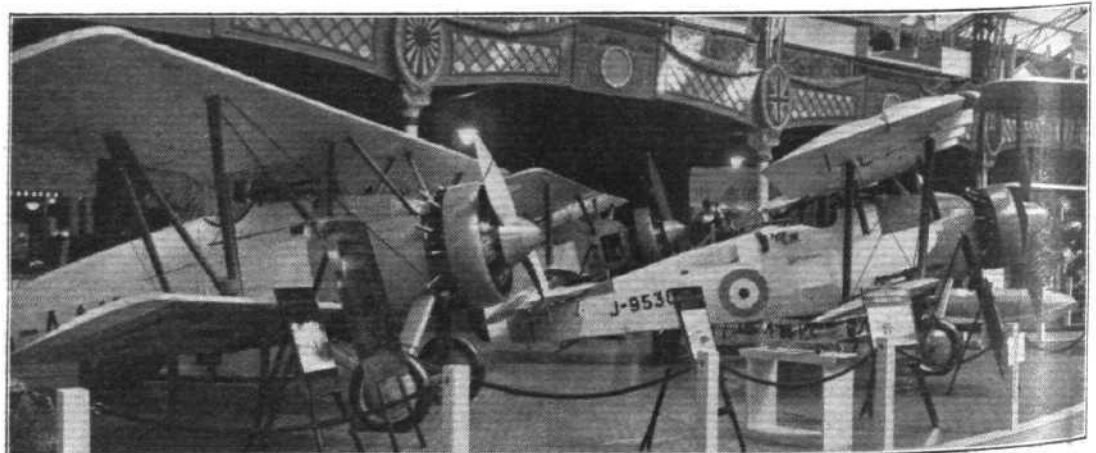


The Cierva "Autogiro" : Fitted with an Armstrong - Siddeley "Genet" engine in an American type of cowl, this rotating wing machine is a two-seater light 'plane.

("FLIGHT" Photo.)

Some of the Armstrong Whitworth machines : On the left the A.W.14, on the right the "Atlas," and behind them the "Siskin." Note that all are fitted with the "Townend ring."

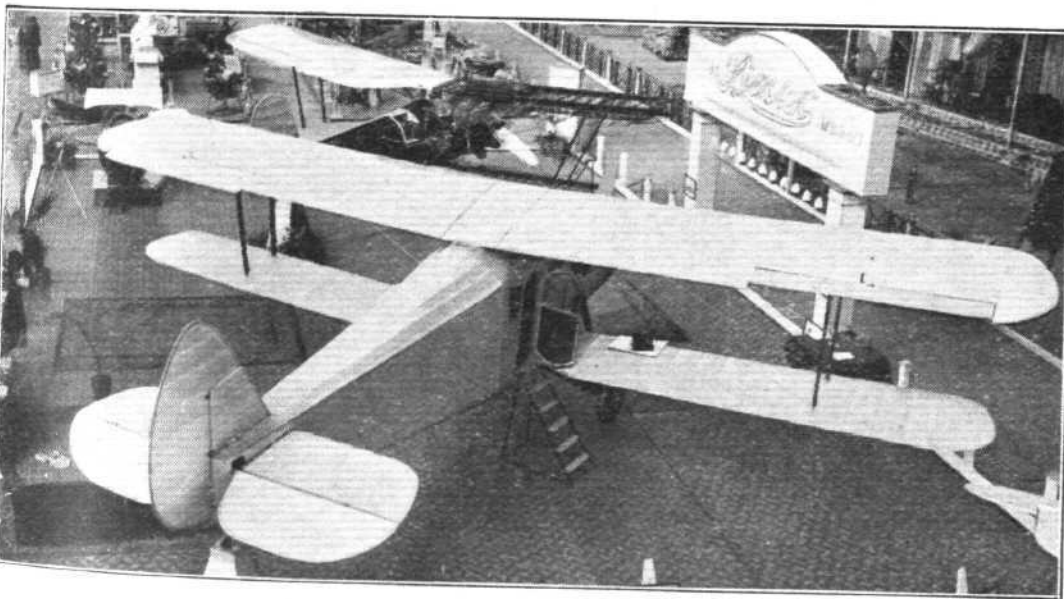
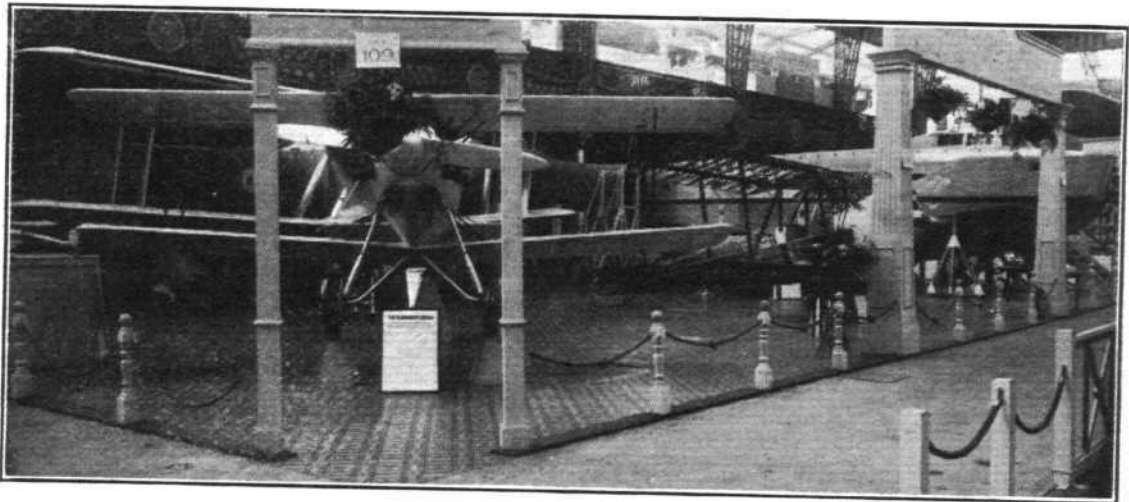
("FLIGHT" Photo.)





On the Avro Stand :  
In the foreground the  
Avro 10 ; on the left  
the Avro 5, and on the  
right the "Avian"  
with "Genet Major"  
engine. (FLIGHT "Photo.")

The Blackburn Stand :  
In the foreground the  
"Lincock." To the  
right of that a "Blue-  
bird" in skeleton, and  
on the right the hull of  
the "Nile" flying-boat.  
( "FLIGHT" Photo.)



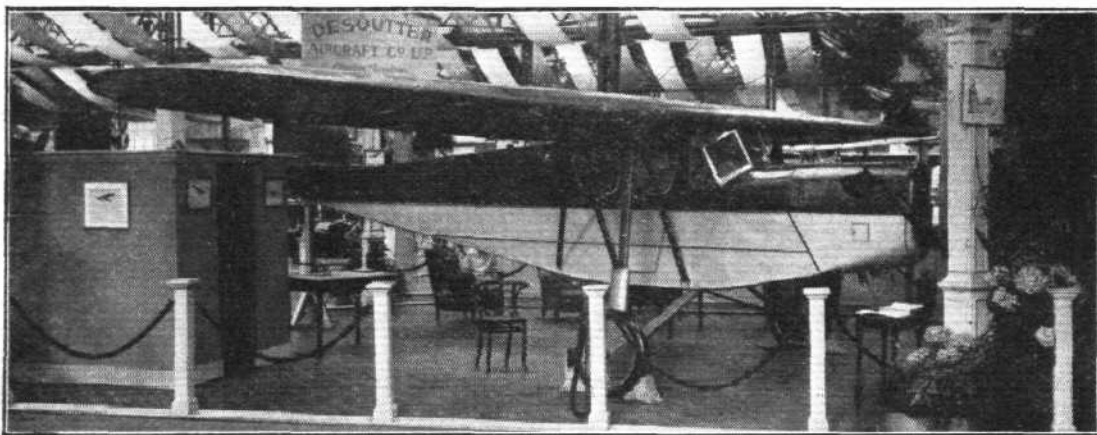
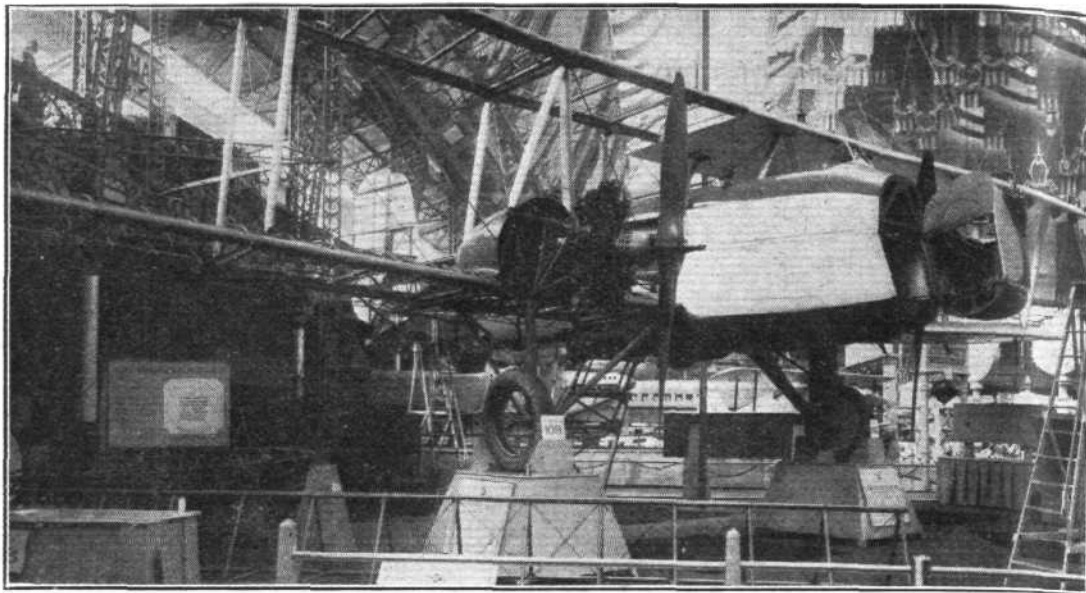
The Bristol Stands :  
On the aircraft stand  
in the foreground may  
be seen the 110A pas-  
senger machine, and  
behind that the "Bull-  
dog" single-seater  
fighter. In the back-  
ground the engine  
stand. ( "FLIGHT"  
Photo.)

"MOTHS" : The de  
Havilland Stand ex-  
hibits "Moths" of all  
types, from a "Tiger  
Moth" up to the  
"Hawk Moth."  
( "FLIGHT" Photo.)



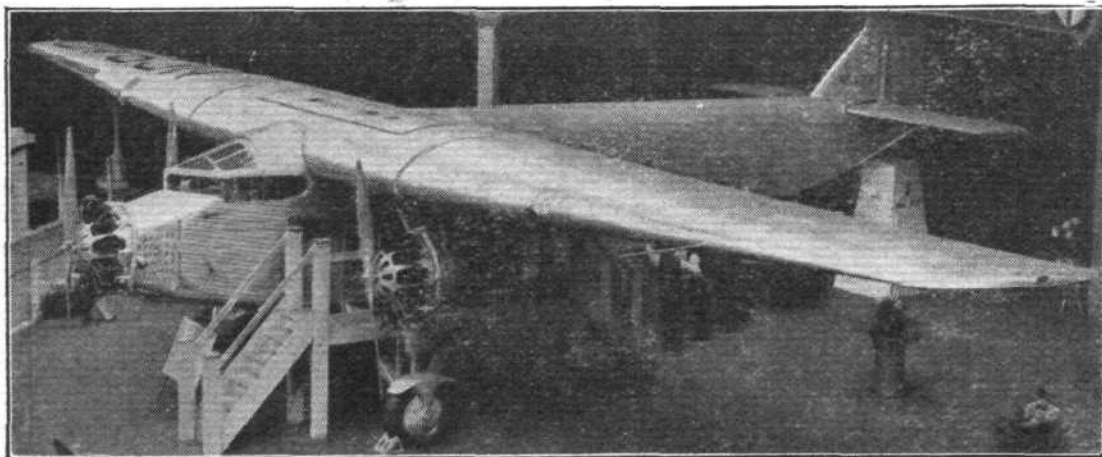
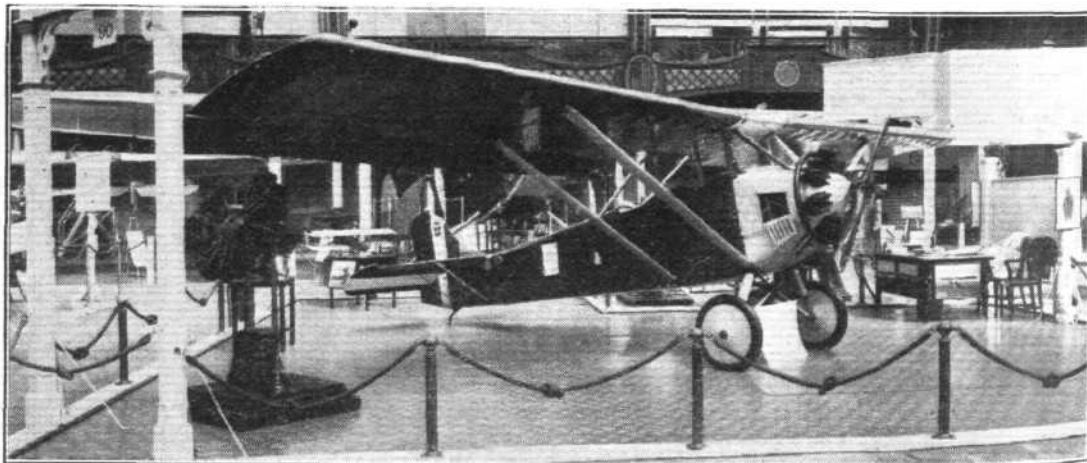


The Boulton and Paul "Sidestrand" is exhibited stripped on one side and covered on the other. Both engine mountings and fuselage nose piece are hinged. ("FLIGHT" Photo.)



The Desoutter Sports Coupé. With accommodation for pilot and two passengers this type should be very useful for taxi work, etc. ("FLIGHT" Photo.)

On the Fiat Stand : The A.S.1 is a two-seater light 'plane, which can be supplied as an "open" machine, as a coupé, and as a seaplane in both forms. ("FLIGHT" Photo.)



The [only American representative : The tri-motored Ford monoplane is of all-metal construction. ("FLIGHT" Photo.)

# What the Press says!

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*Morning Post—27th April, 1929*

**"It must rank as one of the engineering masterpieces of the decade."**

*Yorkshire Post  
13th March, 1929*

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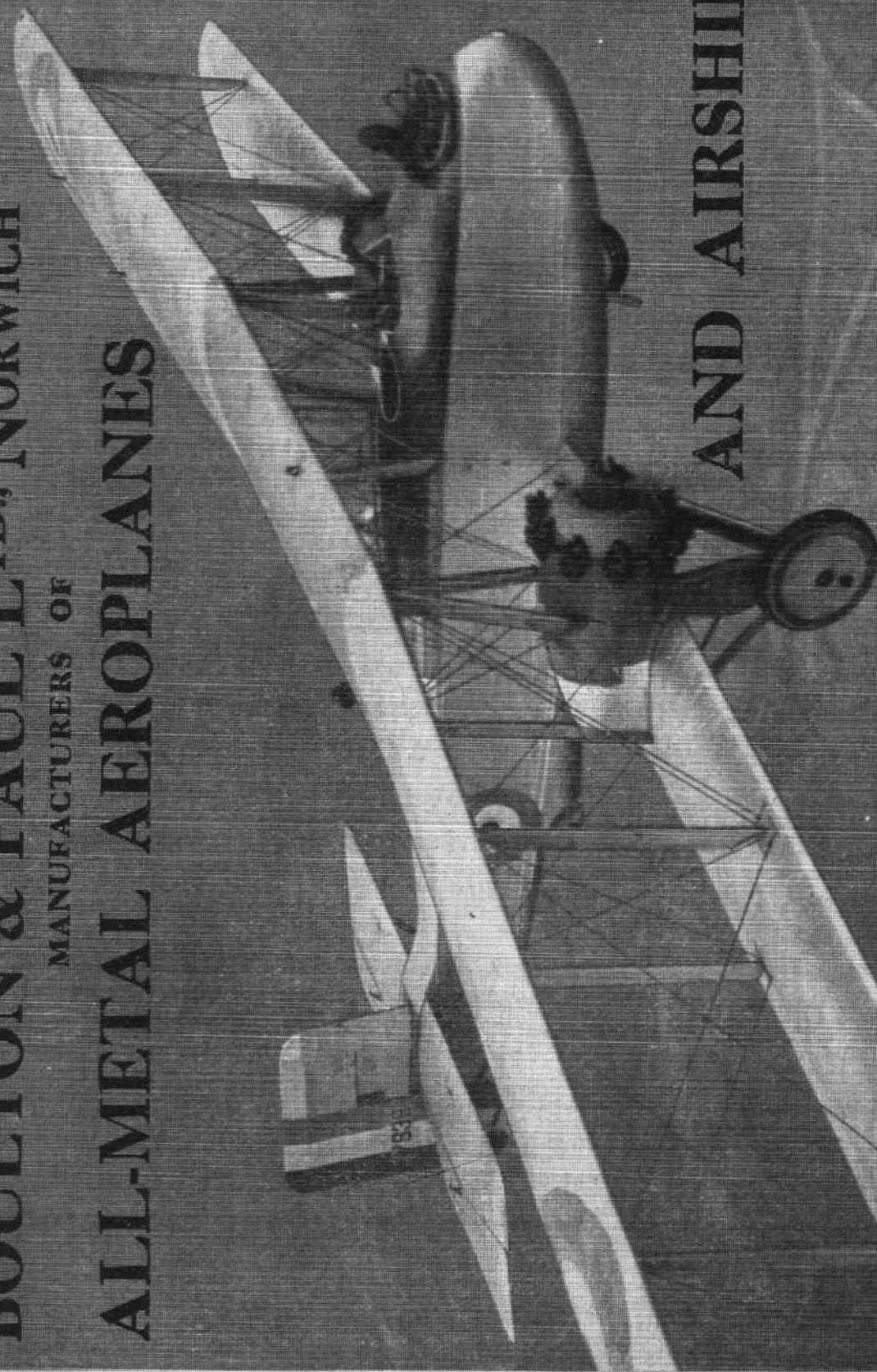
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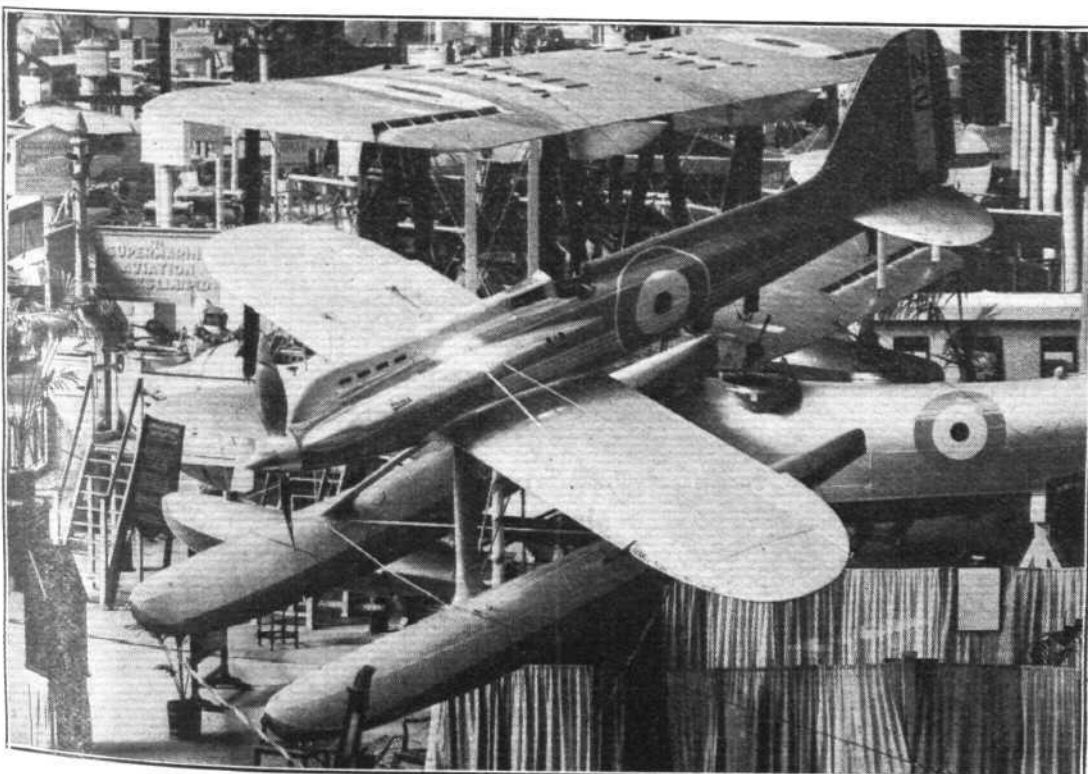
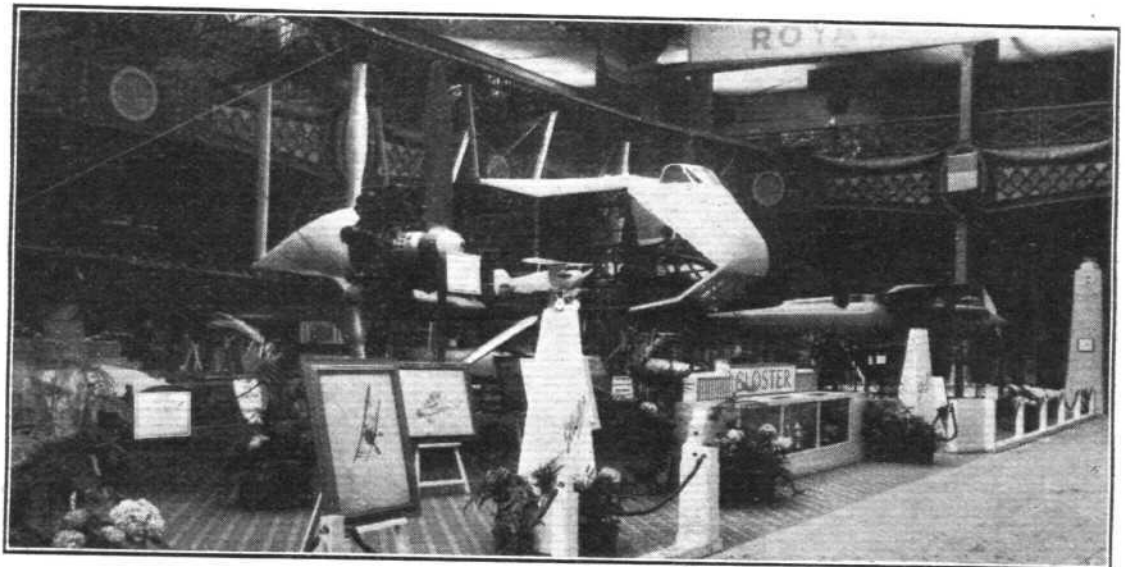
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The Fairey Stand is one of the most impressive individual exhibits at the Show. Note the long-distance mono-plane mounted on the roof of the office.  
(*"FLIGHT" Photo.*)

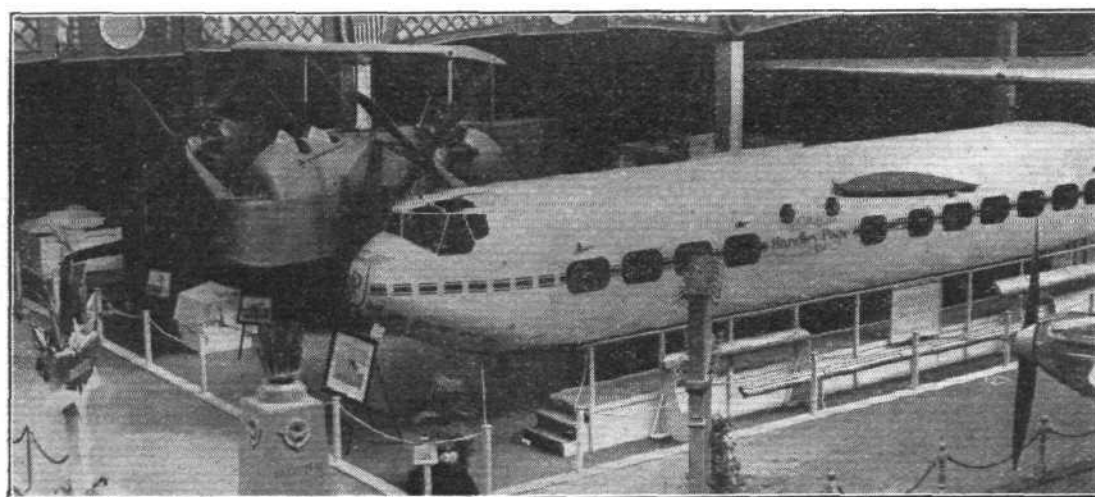
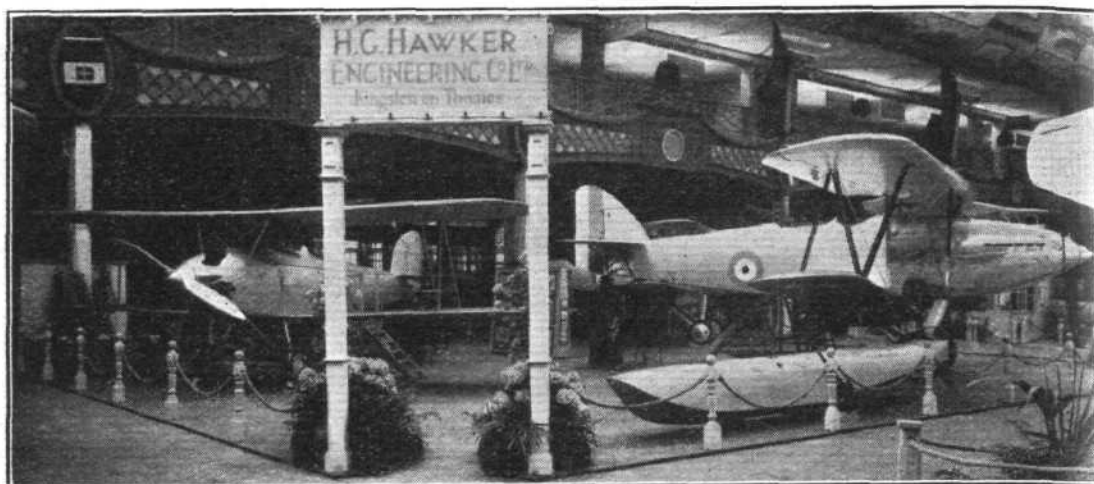
The Gloster Air Survey machine is exhibited in skeleton so that visitors may examine all the details. On the right is seen the "Gloster IV" racing seaplane. (*"FLIGHT" Photo.*)



The Supermarine Machines : In the foreground the S.5 racing seaplane mounted in a very effective attitude. Behind it the "Southampton" flying-boat, which has made a flight of 27,000 miles.  
(*"FLIGHT" Photo.*)

The Hawker Stand has the distinction of exhibiting three machines never hitherto seen in public: The "Tomtit" training machine, the "Hart" day bomber recently ordered in quantities for the R.A.F., and the "Hornet," believed to be the world's fastest single-seater fighter.

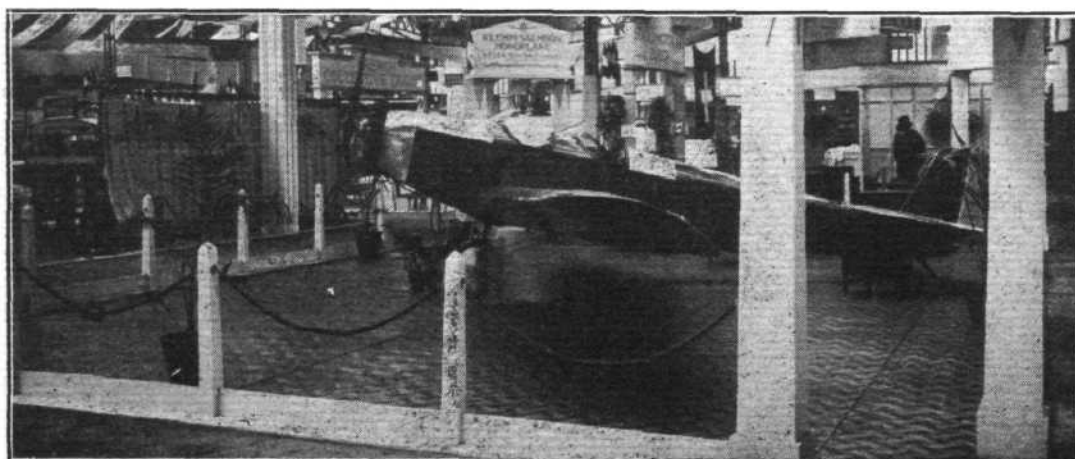
("FLIGHT" Photo.)



On the Handley Page Stand: In the foreground the fuselage of the 40-passenger machine. Behind that the "Hinaidi."

("FLIGHT" Photo.)

A scale model of the Handley Page four-engine 40-passenger aeroplane. ("FLIGHT" Photo.)



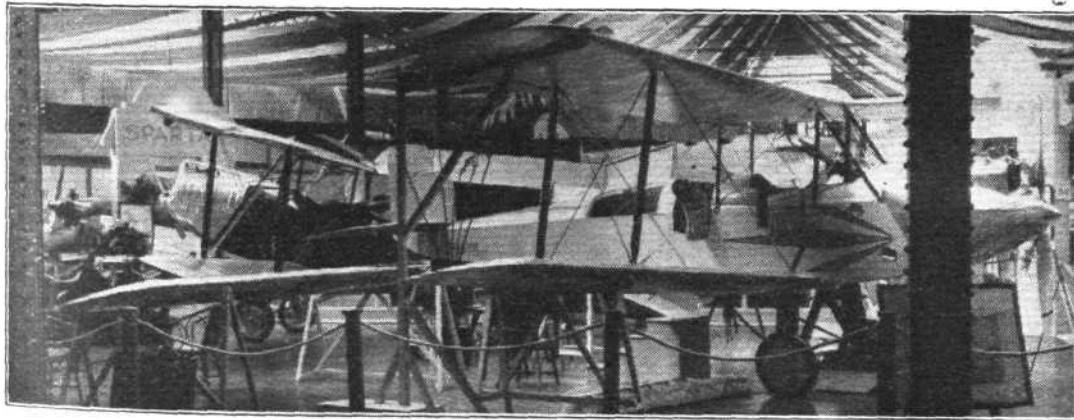
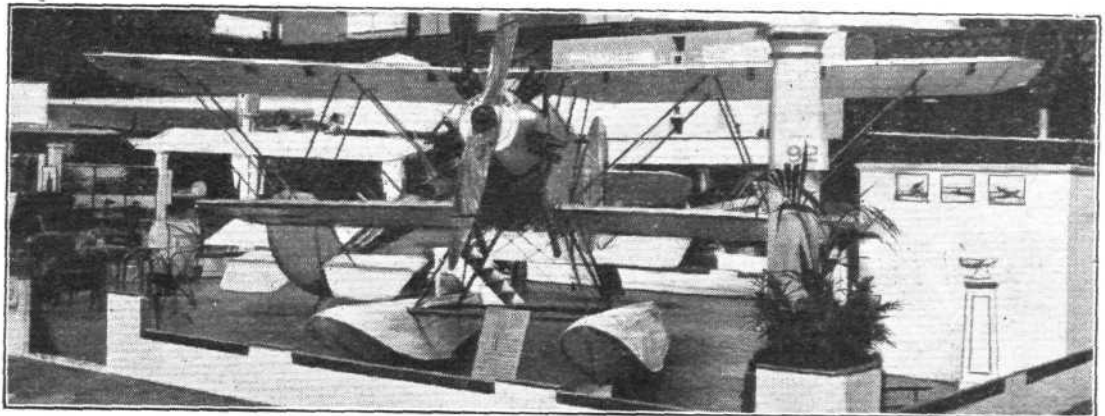
The Klemm-Salmson monoplane is exhibited on the stand of S. T. Lea, who holds the British rights for this machine. ("FLIGHT"

Photo.)



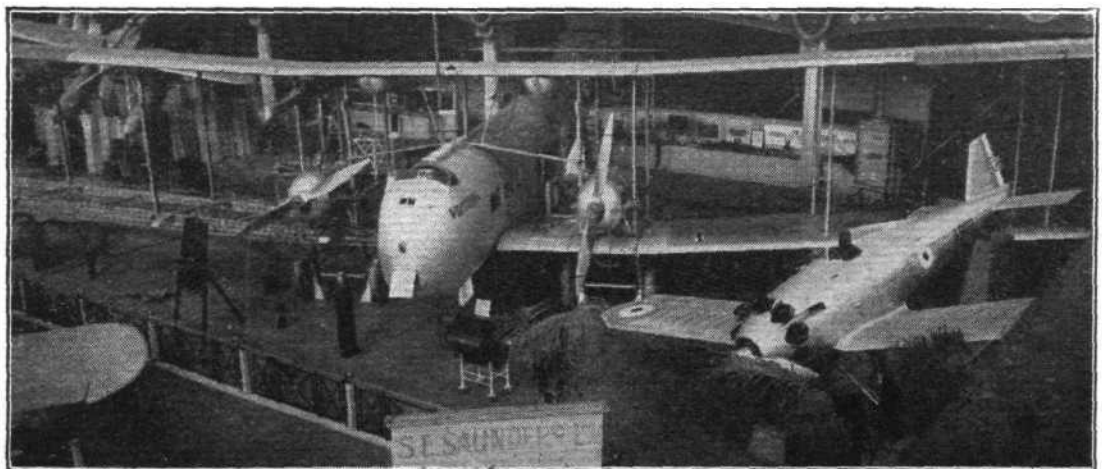
The Glenny and Henderson "Gadfly" is a single-seater light 'plane. It is fitted with Pearson Rotary Ailerons. ("FLIGHT" Photo.)

On the Parnall Stand : In the foreground the "Peto" seaplane designed to work with submarines. Behind it the "Elf" two-seater civilian machine. ("FLIGHT" Photo.)



The Simmonds Stand : "Spartan" two-seaters and three-seaters are shown. The coupé could not be got ready in time for the Show. ("FLIGHT" Photo.)

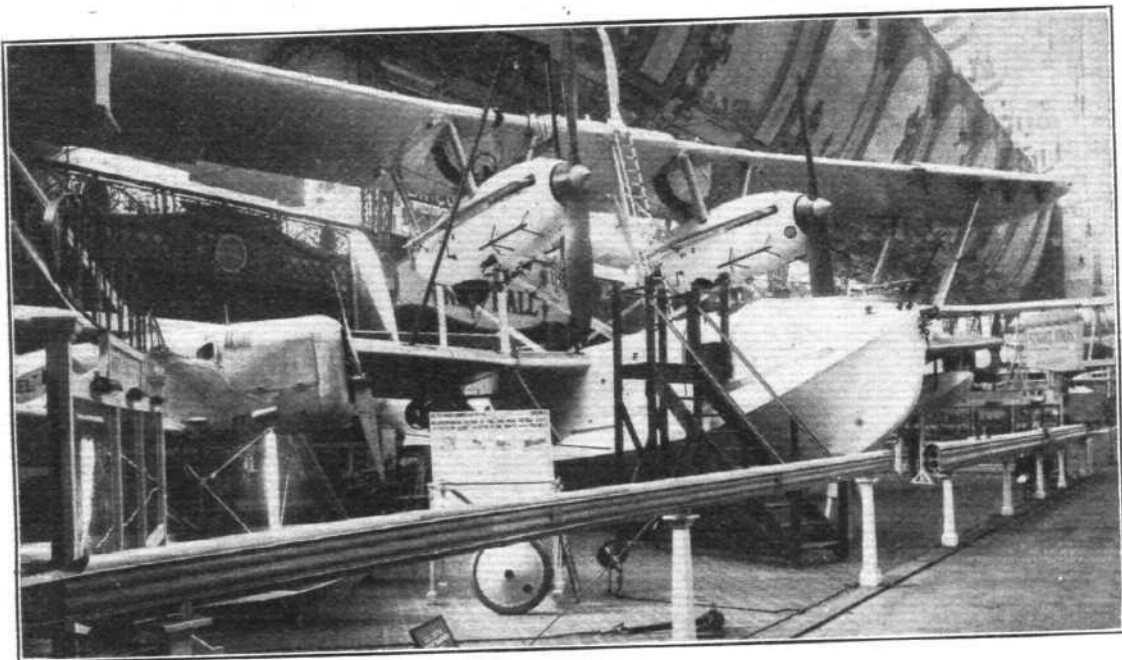
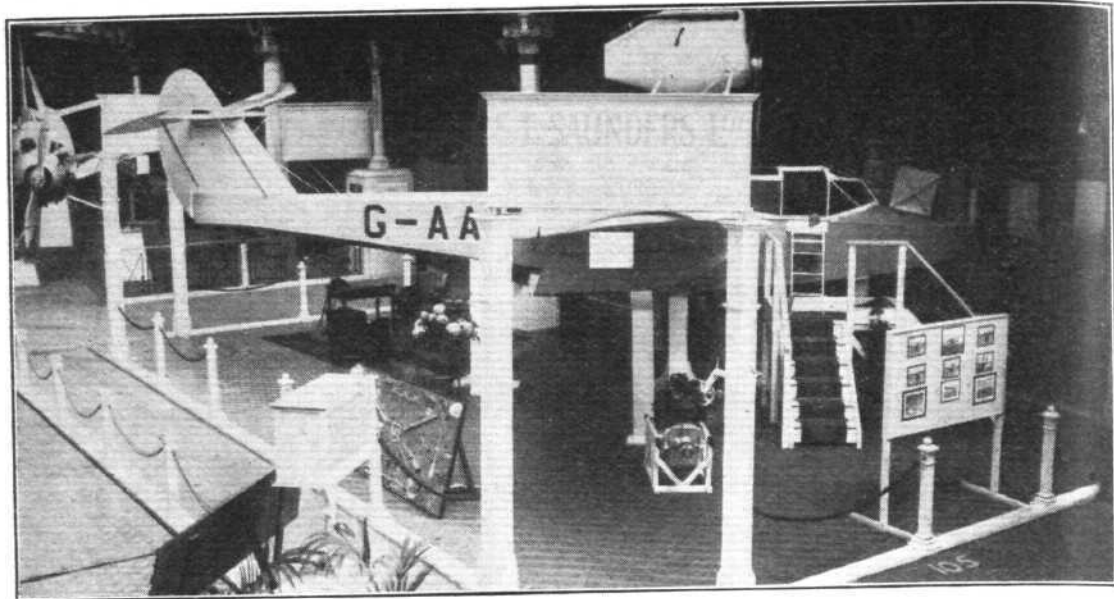
Dignity and impudence are personified, on the Vickers stand, by the "Victoria" troup carrier and the single-seater interception fighter. ("FLIGHT" Photo.)





The Saunders "Cutty Sark" is a small four-seater, twin-engined, flying-boat with metal hull and wooden wing.

("FLIGHT" Photo.)

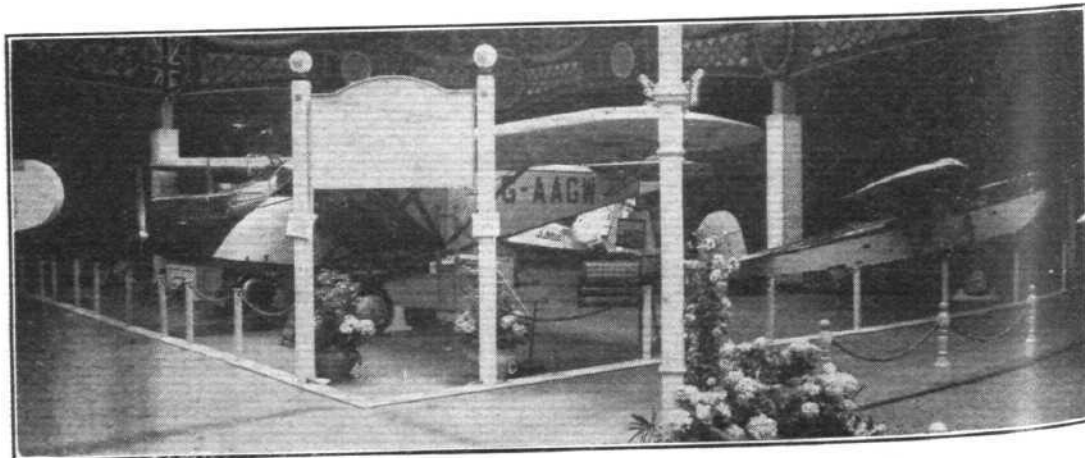


The Short "Singapore" is the machine on which Sir Alan Cobham flew to the Cape and back. A "Mussel" and an amphibian "Moth" are also exhibited.

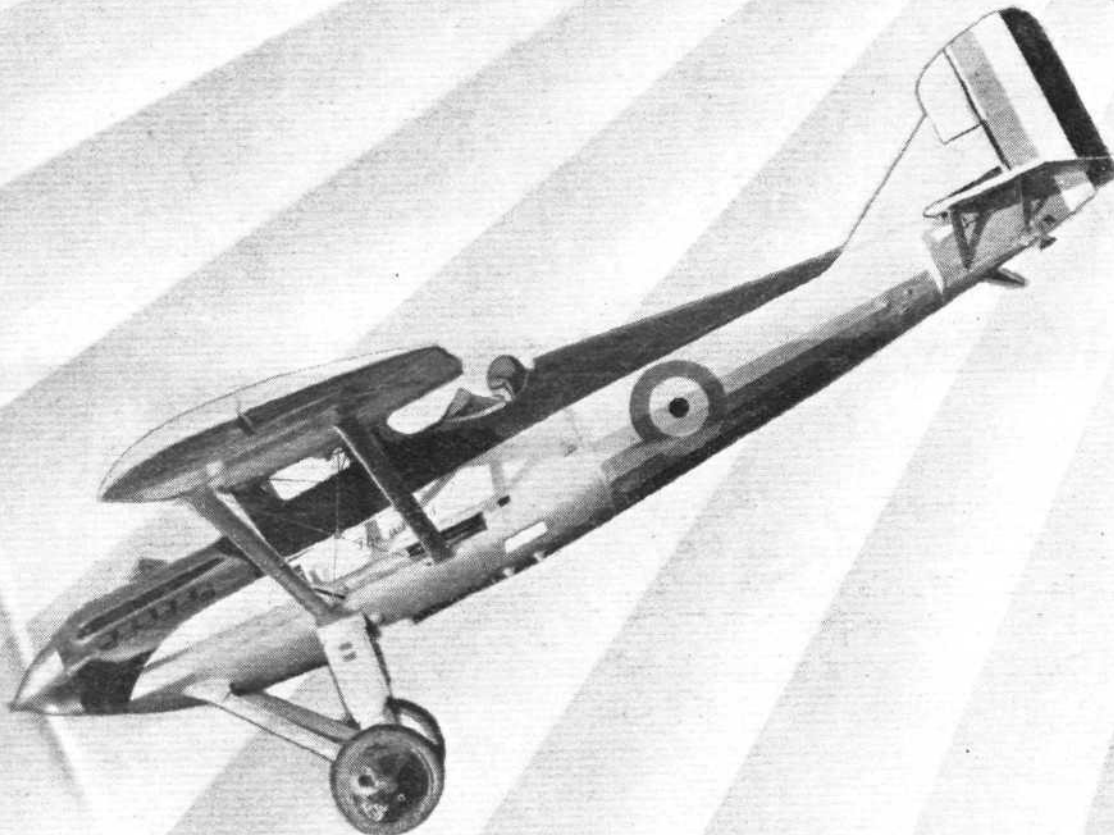
("FLIGHT" Photo.)

The Westland Stand nearly defied our photographer, as no viewpoint could be found which would show the limousine, the "Wapiti" and the "Widgeon."

("FLIGHT" Photo.)



Westland Wizard  
Rolls - Royce  
F. Engine

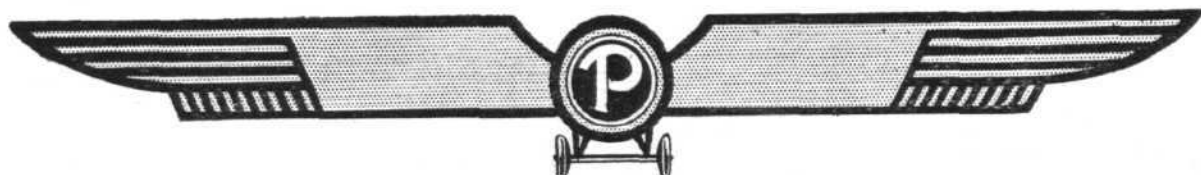


# ROLLS-ROYCE

## AERO ENGINES

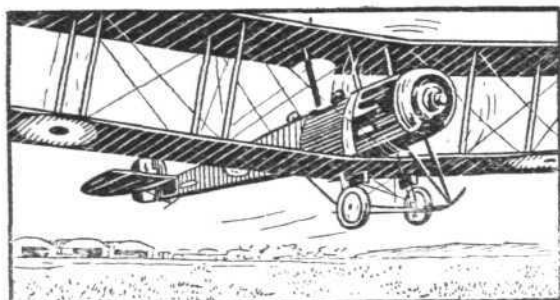
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# SUPREME THROUGH THE YEARS

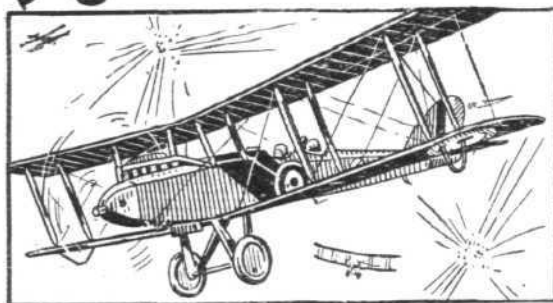
## 1913



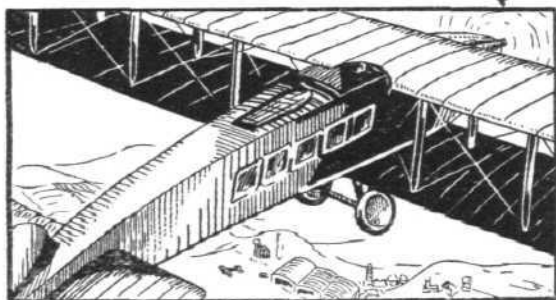
This was the year when Palmer produced the first Landing Wheels and Tyres specially designed for Aeroplane use. Palmer was the only tyre manufacturer who made any intelligent effort to grapple with the problem of supplying Aircraft constructors with suitable Landing Equipment.

## 1914-1918

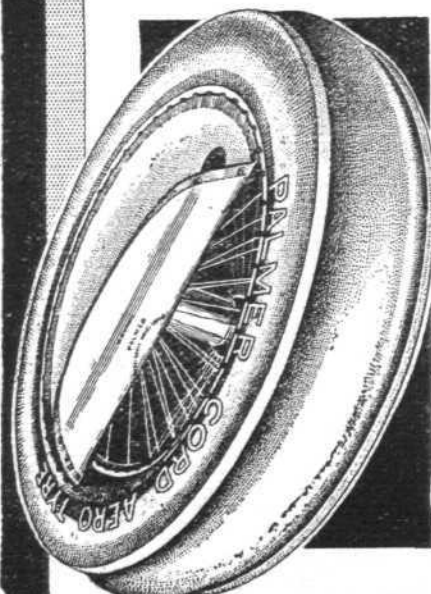
These were the War years, when the entire British demand for Aeroplane Landing Wheels and Tyres was met by Palmer. Every British machine which left England was equipped with Palmer Landing Wheels and Tyres.



## 1919-1929



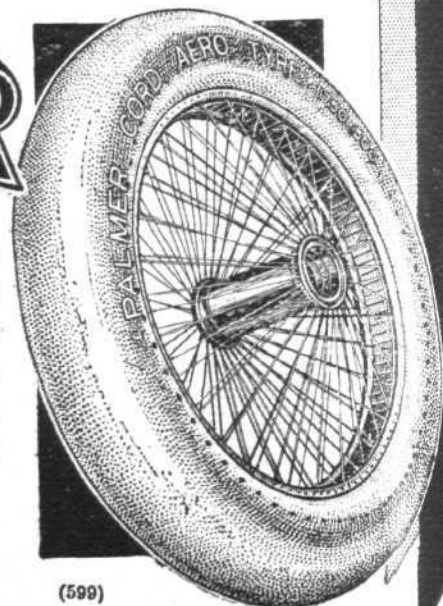
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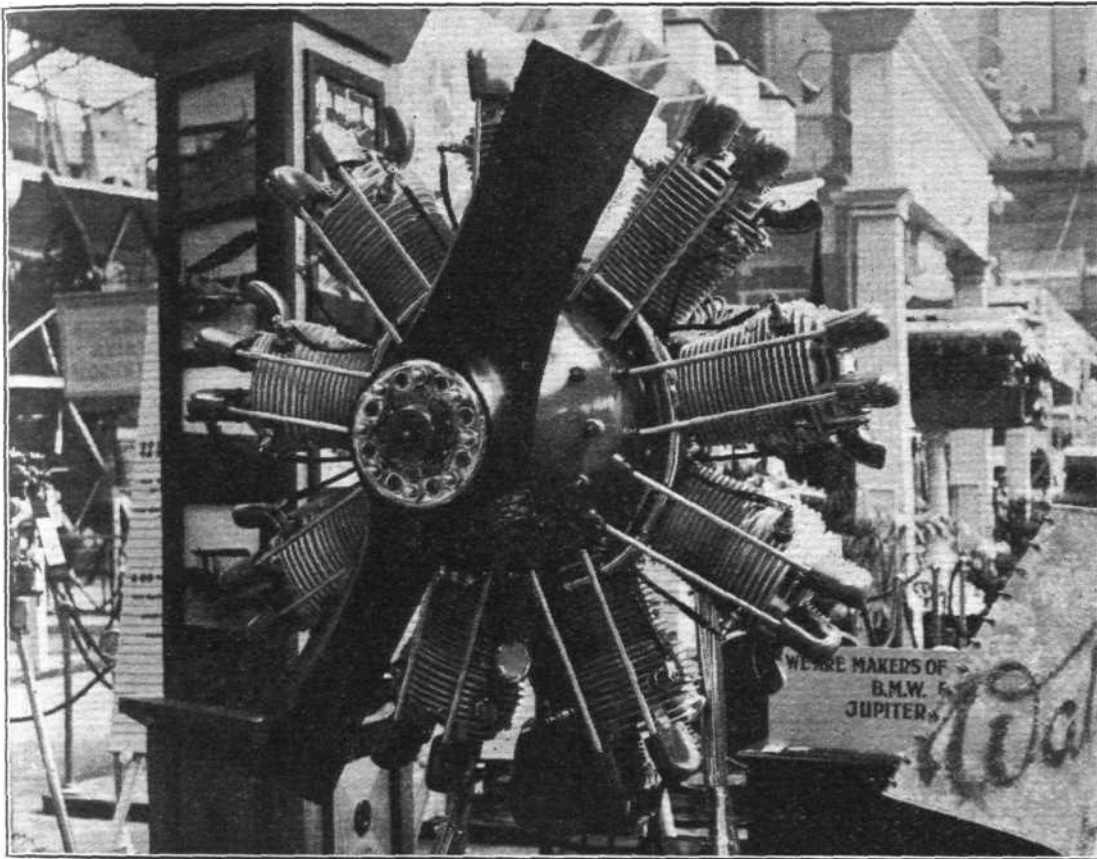
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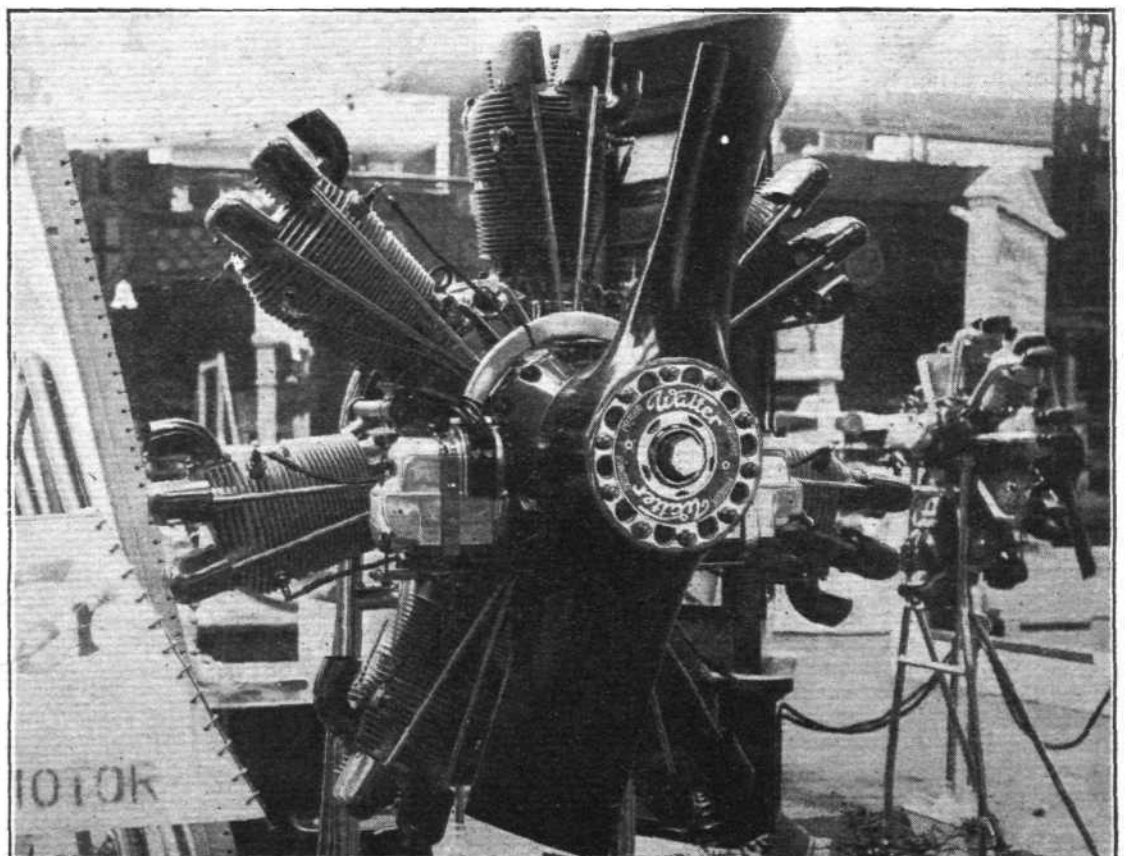
# FOREIGN AERO ENGINES AT OLYMPIA

ONE of the outstanding features of the Show is that the total number of engine exhibits is almost equally divided among the British and foreign firms. Five European countries, Czechoslovakia, France, Germany, Italy and Switzerland, are represented, but it is greatly to be regretted that no American engines are shown, excepting the Pratt and Whitney "Wasps" in the Ford tri-motored monoplane; these, however, can hardly be included as engine exhibits.

The foreign engines include representatives from all classes and types, there being one 20 h.p. air-cooled horizontal opposed miniature 'plane engine and, at the other end of the scale, one each of the water-cooled "broad arrow" and V-types of 1,000 h.p. It is also interesting to note that the air-cooled four-cylinder in-line type, so successfully developed in this country, now has attracted the attention of designers abroad.



The Walter "Mars" is a 9-cylinder radial of 145 h.p.



The Walter "Castor" is a high-compression engine, with a maximum full-throttle power of 340 b.h.p. at ground level.

## CZECHOSLOVAKIA

J. Walter &amp; Co.

AMONG the foreign engines Czechoslovakia is represented by the firm of J. Walter & Co., Ltd., of Prague, who are showing four of their air-cooled radial engines. Walter engines are in use in every country in Europe and also in America, but are not perhaps so well known here as they deserve to be. The engines shown include three of a new series in which the cylinders, pistons, valve gear and other components are interchangeable, these engines being the five-cylinder 85 h.p. Vega I, the seven-cylinder 110 h.p. Venus I, and the nine-cylinder 145 h.p. Mars I. The fourth exhibit is the seven-cylinder 240 h.p. Castor, also a new engine similar in general construction to the three previously-mentioned, but of larger dimensions. All four are of the direct-drive normally-aspirated type.

The three engines of the same series all have a bore and stroke of 105 mm. and 120 mm. respectively and a compression ratio of 5.15 : 1, the normal and maximum crankshaft speeds being 1,750 r.p.m. and 1,800 r.p.m. respectively. The normal and maximum outputs are 85 and 90 b.h.p. (Vega), 110 and 115 b.h.p. (Venus), 145 and 150 b.h.p. (Mars).

The cylinders are of composite construction having steel barrels turned from the solid forging, to which are screwed cast aluminium alloy heads. The barrels are secured to the crankcase by flanges, studs and nuts. An unusual feature is that the heads are intended to be detachable without removing the whole cylinder from the crankcase, as they are assembled cold and do not therefore make the more usual permanent assembly. Each head is secured by a halved ring which is clamped around the lower end by two bolts. Each head is provided with two bronze valve seats, guides and sparking plug adapters, the latter being located horizontally at the front of the head. The valve rockers have roller pivot bearings, the spindles being mounted in brackets which are secured directly to the head. It is of interest to note that even on their largest engine no attempt has been made by this firm, to compensate the valve gear to allow for cylinder "growth," the makers having carried out exhaustive tests, to prove the necessity or otherwise for incorporating this refinement, and that they only decided against doing so when they were thoroughly satisfied that the "growth" was proved to have a negligible effect. Each valve is fitted with double concentric springs, whilst detachable sheet metal covers of the helmet type enclose the whole of the valve gear. In the five- and seven-cylinder engines a single cam ring is used, this being driven through the usual train of gears. The crankcase is split on the plane containing the cylinders, the long securing bolts serving also to anchor the engine to its mounting plate.

The crankshaft is of the two-piece type, the master rod big-end being in one piece and mounted on the crankpin on two roller bearings. The aluminium alloy pistons are secured to the tubular auxiliary rods by fully floating gudgeon pins, these working in bronze bushes. The crankshaft is supported by three ball bearings, one against each crank web, whilst a deep groove ball bearing at the forward end of the shaft acts as a combined thrust and journal bearing. All the auxiliary drives are located at the rear of the crankcase. The oil pressure pump is of the adjustable plunger type of special design, as it also acts as the scavenger. Provision is made for the fitting of the gas distributor of the Viet starting system.

In the five and seven-cylinder engines a Zenith type 50 J carburettor supplies mixture to an annular induction chamber formed in the rear portion of the crankcase, from which the mixture passes to the rear of the heads by the usual induction pipes. On the nine-cylinder engine a duplex Zenith type 42 DCI carburettor is fitted. In each case the carburettor is mounted in an accessible position below the rear half of the crankcase. The two Scintilla magnetos are mounted on brackets cast integral with the rear cover, their spindles being in the fore-and-aft sense and parallel to each other, with the distributors facing forward. The weights of these three engines are 226 lb., 393 lb. and 350 lb. for the five, seven and nine-cylinder types respectively.

The seven-cylinder Castor has a bore and stroke

of 135 and 170 mm. respectively, and a compression ratio of 6 : 1, the normal output being 240 h.p. at 1,750 r.p.m. The output at ground level at a maximum speed of 1,850 r.p.m. is 260 b.h.p., but the full throttle power is 340 b.h.p. at ground level, thus the engine has a power reserve of nearly 40 per cent.

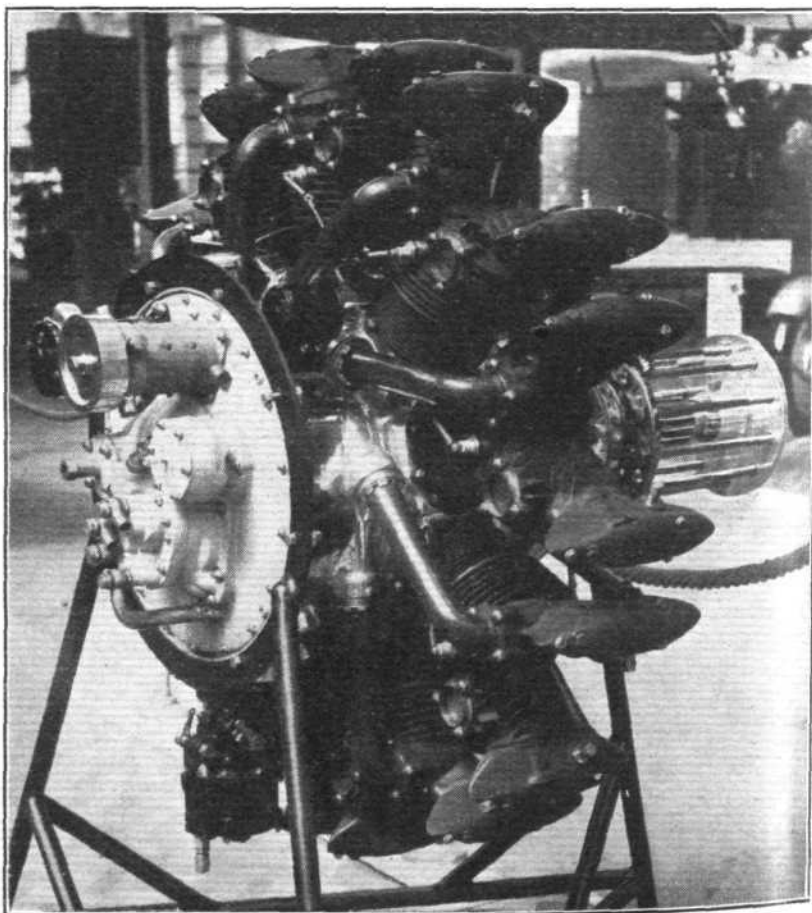
The cylinder construction and valve gear is the same as that of the smaller engines, with the exception that triple concentric valve springs are fitted and the inlet and exhaust tappets are operated by separate cam rings. Roller bearings are used for the master rod big end and for the support of the two-piece crankshaft, a separate thrust bearing being provided. In this engine all the auxiliary drives are located at the rear, excepting those of the two Bosch or Scintilla magnetos, these being mounted transversely on brackets cast integral with the front cover. The magnetos are bevel driven by the intermediate gear spindle in the cam ring driving train. The induction system has also been modified, a Zenith type 60 D.C.J. twin-choke carburettor supplying the mixture through two pipes to a separate induction chamber bolted to the rear of the crankcase, this chamber housing a distributing fan. Both the induction chamber and the carburettor are jacketed by the warm oil on its return from the scavenge pump to the oil tank. The oil pressure and scavenge pumps are of the gear type in this engine. The auxiliary drives include a connection for the generator supplying the electrical equipment of the aircraft, revolution indicator, gas starter distributor and fuel pump. The weight of the Castor engine is 550 lb., including the air-screw hub.

## FRANCE

FRANCE is well represented at the Show by five firms, the number of French engines exhibited totalling 22, divided as follows:—three Hispano-Suiza (all water-cooled), two Farman (one air- and one water-cooled), five Lorraine (two air- and three water-cooled), six Renault (two air- and four water-cooled), and finally, six Salmson, all air-cooled.

## Farman

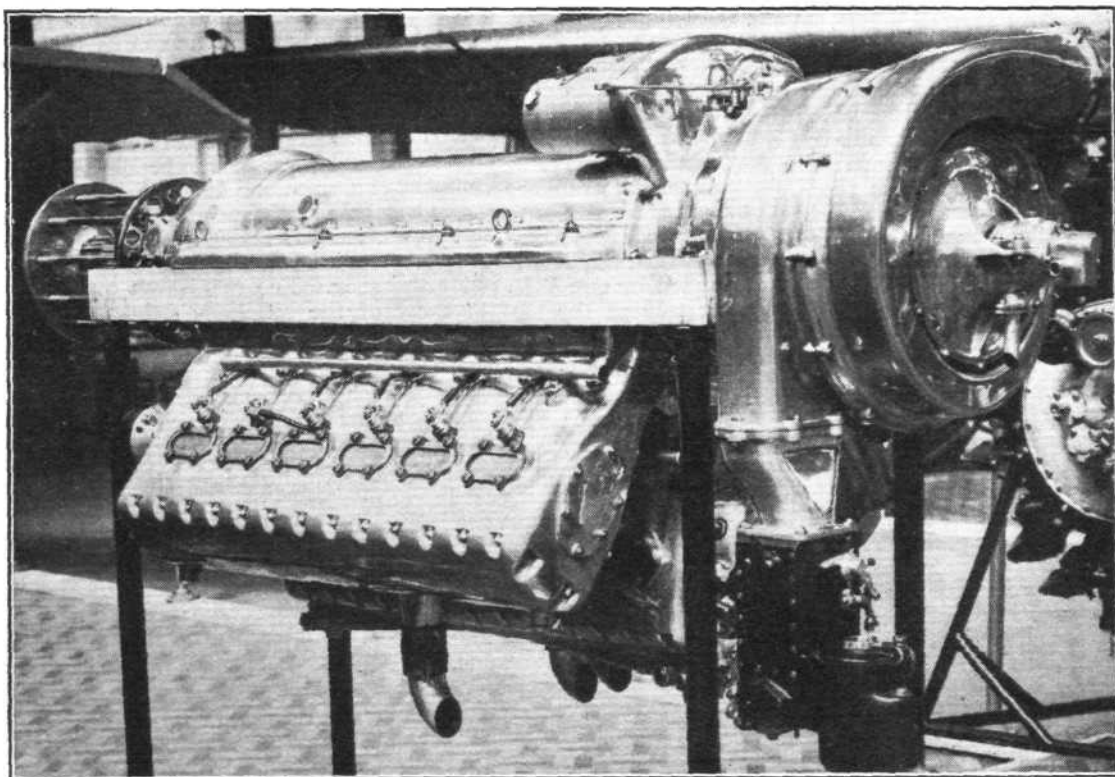
Two Farman engines are exhibited on the Farman Stand, one being an inverted 600-h.p. eighteen-cylinder water-cooled broad arrow type, whilst the other is a nine-cylinder air-cooled radial of 250 h.p. Both are fitted with the Farman reduction gear. The 18 WI, or water-cooled engine, was



The Farman 9-cylinder radial air-cooled engine is fitted with reduction gearing, and develops normally 250 b.h.p. at 2,500 r.p.m.



The Farman inverted engine is of the water-cooled "broad arrow" type and develops a normal power of 600 b.h.p. at 2,800 r.p.m. It is fitted with the Farman reduction gear.



produced about two years ago, although this is the first time it has been seen in this country. It has many interesting features apart from the fact that it is of the inverted type. The normal output of 600 b.h.p. is developed at a crankshaft speed of 2,800 r.p.m., whilst the maximum output of 730 b.h.p. is attained at a crankshaft speed of 3,400 r.p.m., these high engine speeds being made possible by the small cylinder dimensions (110 mm. bore and 125 mm. stroke) and the reduction gear of 0.407 : 1. The latter is of the well-known bevel epicyclic type, but instead of the usual arrangement of equal size bevel wheels, giving an airscrew shaft speed of half that of the crankshaft, a smaller diameter bevel is fitted at the rear (driver) than at the front (fixed), this resulting in the pinion carrier and airscrew shaft travelling at less than half engine speed, the reduction being greater the smaller the size of driving bevel wheel. The engine shown is fitted with a Rateau-Farman supercharger. The three-cylinder banks are of the monobloc type cast in a silicon-aluminium alloy known as Alpax, whilst the crankcase is of aluminium. The blower casing of the supercharger unit is bolted to the rear end of the crankcase. The one-piece crankshaft is carried in seven plain bearings, the housings being fitted with duralumin caps. The connecting rod assembly is of the type usually employed in broad arrow engines.

An interesting feature is that the "overhead" camshafts (if this term is permissible with respect to an inverted engine) are driven through a train of spur gears located at the forward end of the cylinder blocks, instead of by the usual bevel-driven shafts. One of the intermediate wheels of each camshaft driving trains drives an H.T. distributor, coil ignition being used, presumably owing to the high engine speed. At the rear end of the crankcase cover (*i.e.*, the portion that would be the sump in an upright engine) is mounted a starting motor, whilst two 200-watt generators are fitted one at each side of the starter. In the engine shown a large Zenith carburettor is bolted to the intake of the blower, but the connections between the blower outlet and the induction manifolds are not shown as it is intended to include a mixture cooler in the aircraft installation, between the blower and engine, to maintain the correct mixture temperature and density. Two A.M. mechanical fuel pumps are provided. The dry weight of this engine complete with starter and batteries is 930 lbs. only.

The type 9 EA radial engine is of orthodox design. It has the distinction, however, of being the highest speed radial engine in the Show, again thanks to the Farman reduction gear, which is of the normal 0.5 : 1 type in this case. The normal output is 250 b.h.p. at 2,500 r.p.m., the maximum output being 280 b.h.p. at 2,700 r.p.m. The engine may be provided with magneto or coil ignition, that shown having the latter. The cylinders have a bore and stroke of 115 mm. and 120 mm. respectively and are of composite construction, having steel barrels and aluminium heads in which the inlet

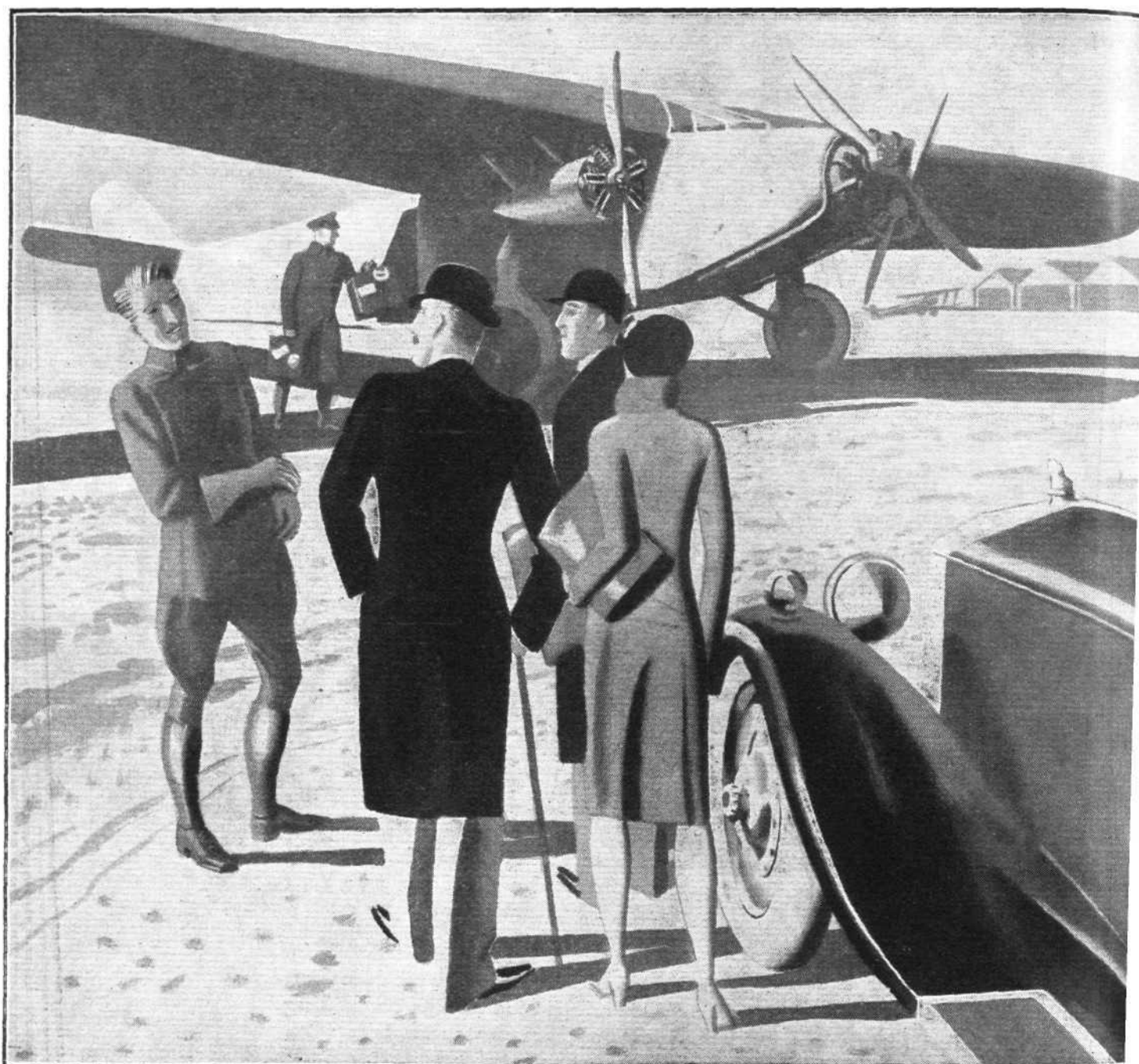
and exhaust ports are located at the rear, the latter being deeply finned. The two valves of each cylinder and their rockers are totally enclosed in stream-line housings, these being fitted with grease nipples, whilst the push rods are enclosed in tubes. The rocker bearing supports are cast integral with the heads, the bearings being carried by the valve gear housings. The crankshaft is of the two-piece type, the master big end being made in one and fitted with a floating bush.

A small electric starting motor is fitted to the rear cover, as also are the oil pumps and the 24-volt 300-watt generator. The two coil units are mounted on the top of the fore part of the crankcase, automatic advance being provided. The Duplex Zenith carburettor supplies mixture to a distributing chamber formed in the rear portion of the crankcase, this housing a geared-up distributing fan. The weight of this engine is 536 lbs., including the starting motor.

#### Hispano-Suiza

Three of their cleanly designed and exquisitely finished water-cooled engines are shown by the Hispano-Suiza firm on the stand of Hispano-Suiza (Great Britain, Ltd.). One is the new six in-line 100 h.p. type 6 Pa. engine, which has recently been developed for use in light aeroplanes, whilst the other two are of the 60° 12-cylinder V type, one being the geared 500-h.p. type Hbr, the other being the most powerful engine yet marketed by this firm, the direct-driven type 12 Nb, this engine being rated at 650 h.p. but actually developing 750 b.h.p. These two engines provide an interesting comparison, for although the later type has an increase in power of 30 per cent. (*i.e.*, in direct proportion to its increased capacity), its dry weight (1,030 lbs.) is the same and its length is actually  $4\frac{1}{2}$  in. less than that of the 500 h.p. engine. Furthermore the compression ratio, 6.2 : 1, is the same as that of the older type. This economy in weight has been partly achieved by a change in the form of cylinder construction. In the earlier engines thin steel liners were screwed into aluminium barrels cast integral with the cylinder block, the cooling water being in contact with the aluminium portion only, but in the later design the cylinders are formed by ribbed steel barrels, which are secured in the aluminium monobloc castings at the top and bottom only, the jackets following closely the contour of the cylinders instead of being straight-sided for almost the whole length of the cylinders. A further innovation in the later engines is the use of nitrogen hardened steel wearing surfaces, including the cylinder bores. A sample barrel with a mirror-finished bore is shown on the stand, visitors being invited to "make their mark" on the bore by fair means or foul, either with the smooth file supplied for the purpose or with any other instrument; the surface has successfully resisted all such efforts to date. This new "Niturizing" process was perfected by the firm last year





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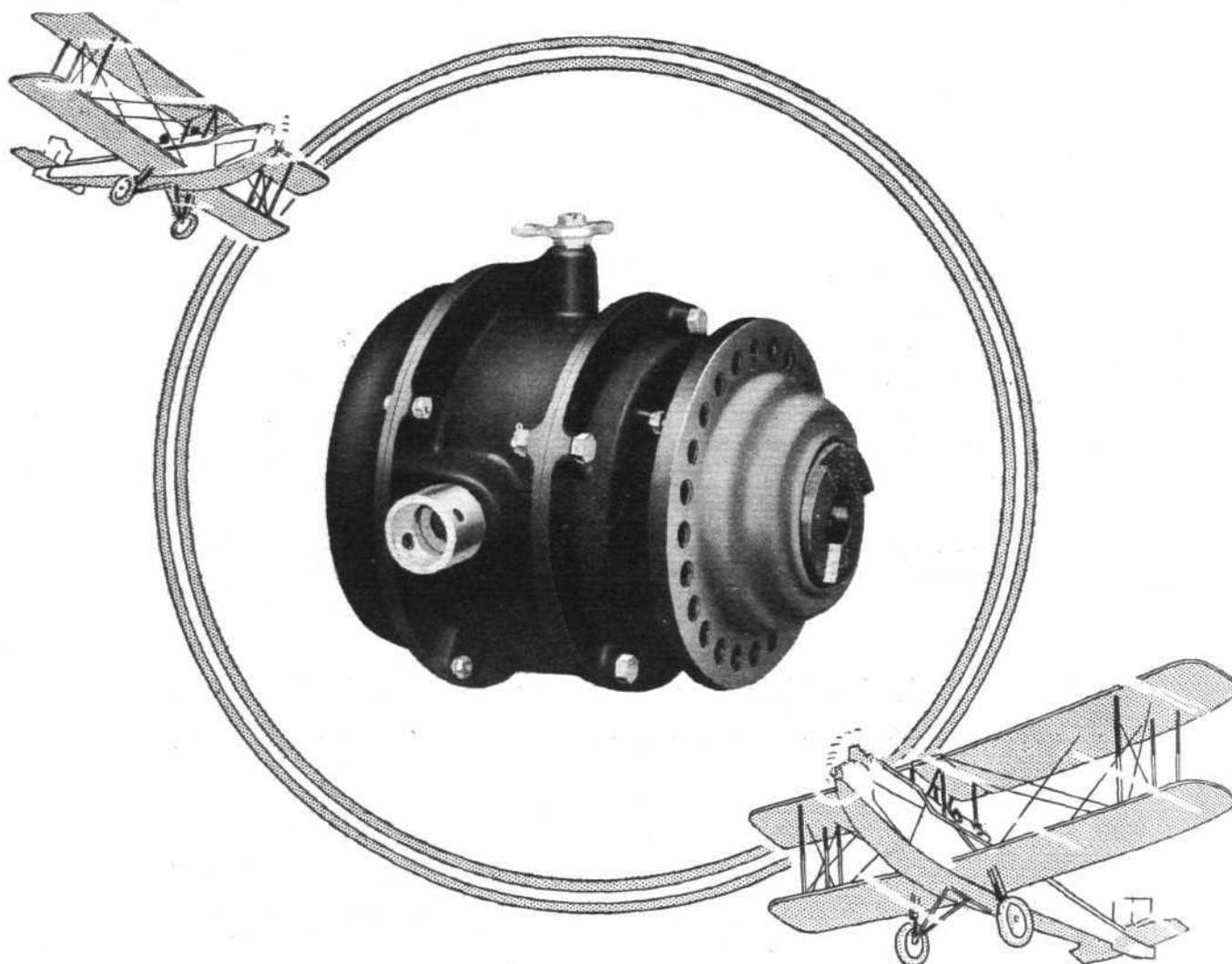
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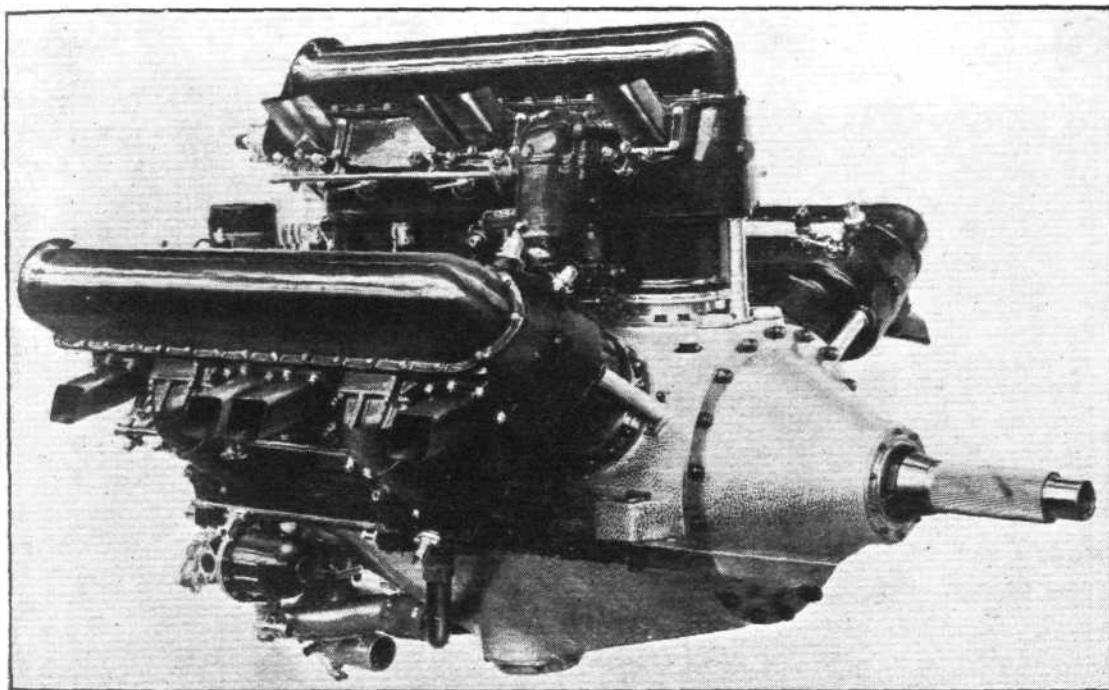
gas starter distributor is fitted at the rear of the engine in each case.

The 100-h.p. type Pa. engine is also similar in general arrangement and may be regarded as one block of the V type 650 h.p. engine, reduced in size in proportion to the bore and stroke (110 mm. and 140 mm.) and mounted vertically on the crankcase. The new Niturized cylinders are fitted in this engine. The normal speed is 2,000 r.p.m., the airscrew being directly driven; the maximum power is 145 b.h.p. The two R.B. magnetos are mounted transversely at the rear of the block, whilst the single Hispano-Solex carburettor is bolted directly to the starboard side of the cylinder block. The dry weight complete is 384 lbs.

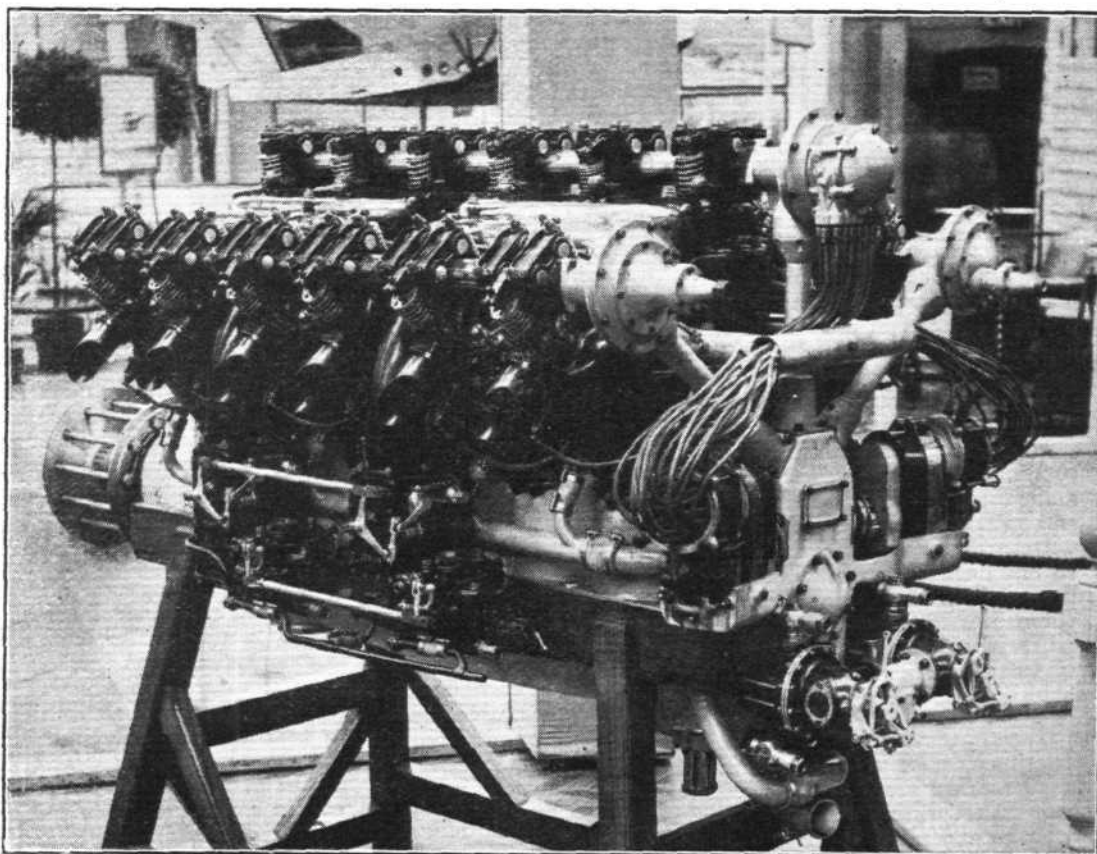
#### Lorraine

Five Lorraine engines are shown on the Stand of the

French combined exhibit, two air-cooled radials and three of the water-cooled broad-arrow type. The radials are of similar design, one being a 100 h.p. five-cylinder engine, whilst the other has seven cylinders, and is rated at 230 h.p., the general appearance of these engines being similar to those of corresponding power in the Armstrong-Siddeley range, although somewhat larger in each case. Of the water-cooled engines one is the old 12 Ed. 450 h.p. type in which each bank of four cylinders comprises two pairs of twin cylinder units fitted with a common water jacket; the second is this firm's latest 600 h.p. type 48.5 12-cylinder engine, this being the most interesting of the Lorraine exhibits, whilst the third is also a comparatively old type, the 18 Kd. type 650 h.p. 18-cylinder engine, this having been shown at the Paris Aero Show of 1926.



The Lorraine type 48.5 engine develops 600 b.h.p. and is of the "broad arrow" type.

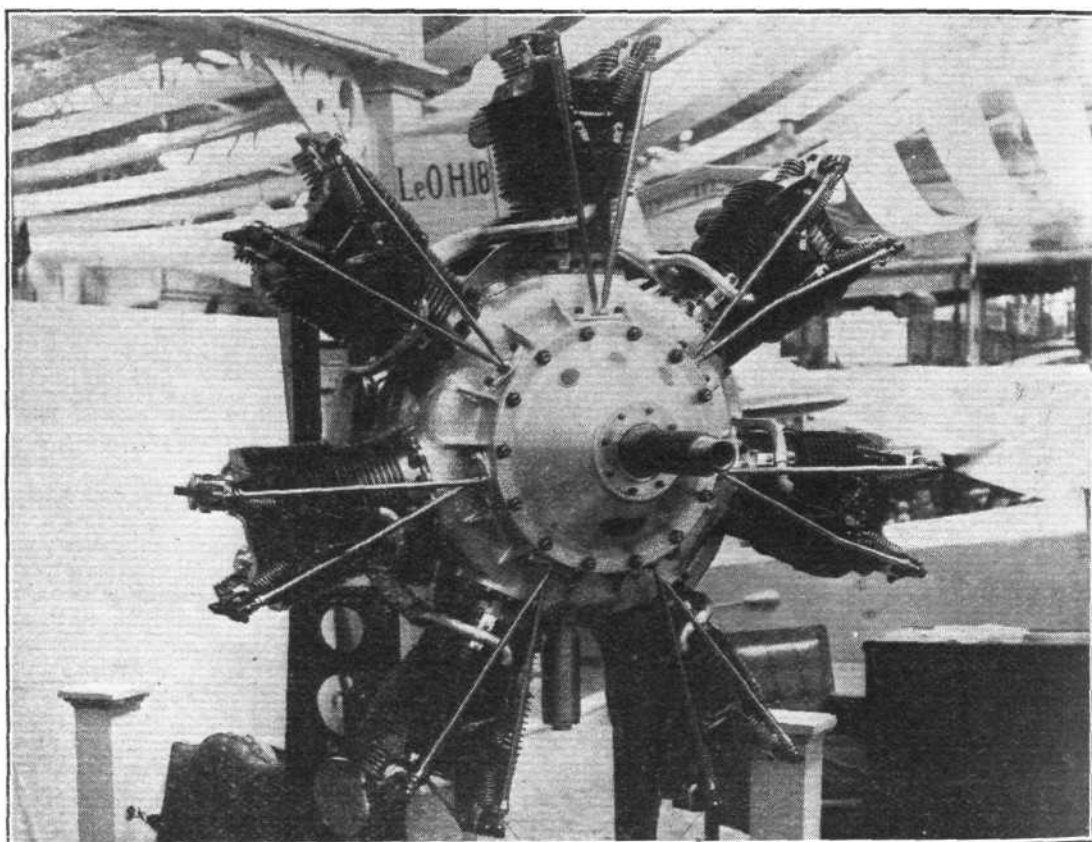


The Lorraine 18-cylinder broad-arrow type 18 Kd. develops 650 b.h.p. at 2,000 r.p.m.

The type 5 Pb. five-cylinder radial engine has a bore and stroke of 125 mm. and 140 mm. respectively and develops a normal output of 110 b.h.p. at 1,650 r.p.m., whilst the type 7 Mb. has a bore and stroke of 135 mm. and 150 mm. and develops 240 b.h.p. at 1,800 r.p.m. The compression ratio is 5:1 in each case. The cylinder construction appears to be generally similar to the Armstrong-Siddeley engines of the types to which they are closely related, the aluminium heads being screwed to the steel barrels and secured in the typical Armstrong-Siddeley manner. The barrels are, however differently secured to the crankcase, integral flanges being formed on the barrels which are held down by a large number of studs and nuts. In the smaller engine the two Ducillier magnetos are fitted transversely at the front of, and the oil pump below, the timing gear cover, but in the seven-cylinder engine all the auxiliary drives are located at the rear. A gas starter distributor and a mechanical fuel pump (two on the larger engine) are fitted to the rear cover of each engine. In each case a Zenith carburettor delivers the mixture to the induction chamber from which the single pipes lead out to the cylinder heads,

The two inclined valves in each cylinder head are operated by a single camshaft located over each cylinder group, the shaft and rocker arms in contact with the cams being totally enclosed, whilst the valve stems, springs and contacting arms are exposed. The camshafts are bevel driven in the usual manner, all the auxiliary drives being located at the rear of the engine. The gun gear and revolution indicator drive is located at the rear end of the centre group of cylinders above the camshaft gear. Forced lubrication to all bearings is supplied by three oscillating plunger type pumps driven by three eccentrics, the pump unit and filter being located at the centre of the bottom of the crankcase. Two A.M. (not Air Ministry but Andre Molet) fuel pumps are driven by an extension of the horizontal shaft driving the oil pumps. Ignition is provided by two Scintilla magnetos, these being mounted transversely at the rear of the engine. A Zenith type 60 J. carburettor is fitted on the outer side of the port cylinder group, a duplex Zenith being fitted outside the starboard group to supply it and the centre group. Water circulation is provided by means of a single centrifugal pump fitted with its spindle vertical, the body of the pump

The Lorraine-type 7Mb radial develops 140 b.h.p. at 1,800 r.p.m.



but no distributing fan is provided. The carburettors are jacketed by warm oil from the scavenge pump. The weights of these engines are 332 lbs. and 615 lbs. for the five and seven-cylinder engines respectively, with accessories.

The type 12 Ed. 12-cylinder broad-arrow engine is of somewhat untidy appearance for an engine of Continental design, this being possibly due to the peculiar camshaft and valve gear arrangement and the branched induction manifolds. This engine gives a normal output of 450 b.h.p. at 1,900 crankshaft r.p.m., and is provided with a simple planetary type of reduction gear having a ratio of 0.647:1. The bore and stroke are 120 mm. and 180 mm. respectively, and the compression ratio is 6:1. The cylinders have steel barrels with welded-on sheet steel jackets, each jacket being common to one pair of cylinders. This grouping of the cylinders in pairs allows the four-throw crankshaft to be supported by three bearings only, one at each end and one between the pairs of cylinders; the journals and big-end bearings are of the plain white-metal bushed type. The reduction gear is of the type used on the Armstrong-Siddeley geared engines, or more correctly the gear is of the Lorraine type, used under licence in this country by Armstrong-Siddeley. Incidentally, it is of interest to note that all the Lorraine geared engines may be readily converted to direct drive by the removal of the planet wheels and their spindles and by fixing a toothed ring to the planet carrier (this being integral with the airscrew shaft), the ring meshing with the internally toothed wheel which is driven by the crankshaft.

being secured to the underside of the crankcase at the rear end.

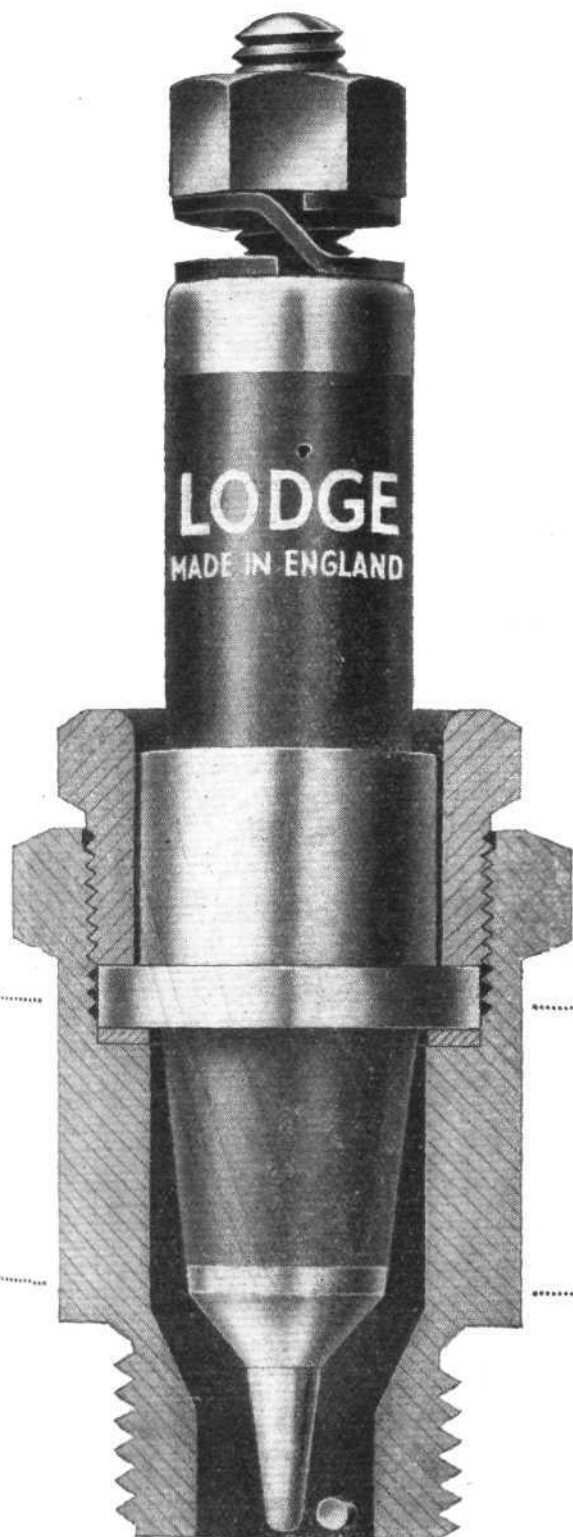
The latest 12-cylinder broad-arrow engine type 48.5 has a bore and stroke of 145 mm. and 160 mm., and develops 600 b.h.p. at a normal crankshaft speed of 2,000 r.p.m., and has a maximum output of 712 b.h.p. at 2,150 r.p.m., the airscrew shaft being driven through a planet reduction gear having a ratio of 0.647:1. As this engine weighs only 1,020 lbs. with the reduction gear, or 930 lbs. if direct driven, the weight/power ratio of 1.5 and 1.7 lbs. per b.h.p. at normal output is remarkable for an engine of this type, as it has been designed for general service, the compression ratio being 5:1 only.

The cylinder construction is entirely different to that of the earlier Lorraine engines, each bank comprising a monobloc jacket casting which is fitted with chromium plated steel barrels which project through watertight joints at the bottom of the jackets. The crankshaft is carried in five bearings, the centre and end bearings being of the roller type, whilst the two intermediate journals are of the plain bushed type, these forming oil-distributing centres for the four crankpins, as the oil supply to the crankshaft is fed by the pump to these two bearings. The arrangement of the auxiliary drives at the rear of the engine is generally similar to that of the earlier engines, with the exception of the gun gear and revolution indicator drive, these being located in a lower position on the vertical camshaft driving shaft. The arrangement of the valve gear is extremely neat. Four valves per

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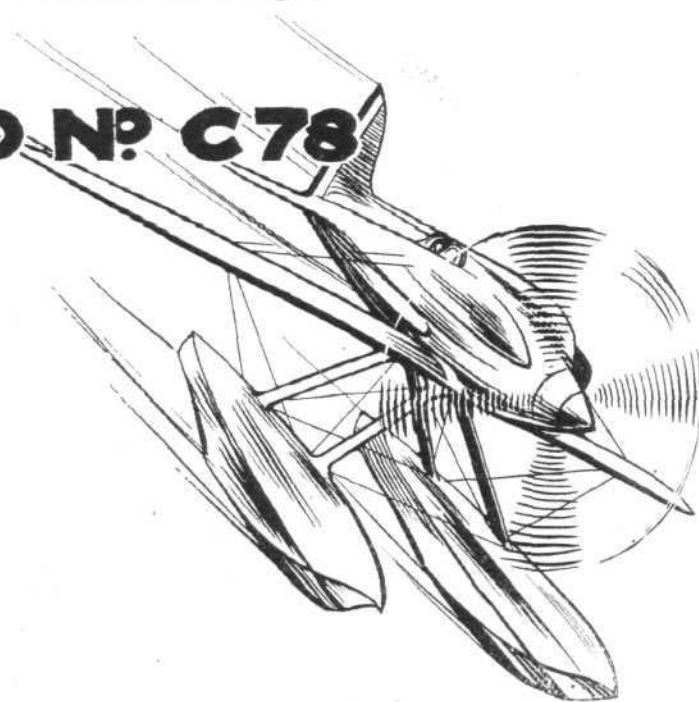
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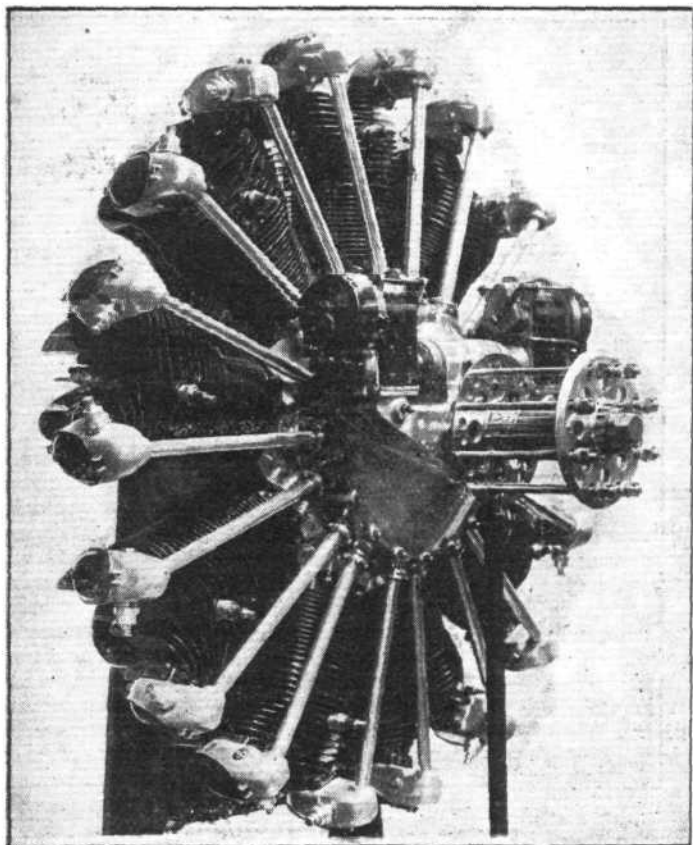
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cylinder are provided, but one bevel-driven camshaft only is used for each bank of cylinders, the pairs of inlet and exhaust valves being fitted one valve on each side of the shaft. The pairs of inlet and exhaust valve stems are operated by the transverse portions of a T-shaped taper fitted between each pair, the cam contacting with the top surface of the head of the T, the stem forming a plunger which forces oil to the valve parts. The valve gear of each cylinder bank is, of course, totally enclosed by an oil-tight cover. Six Zenith carburettors are provided, four for the outer banks, each feeding two cylinders, and one at each side of the centre bank supplies the four vertical cylinders. Ignition is provided by two Ducillier magnetos, these having horizontal distributors.

The 18-cylinder broad-arrow type 18 Kd. engine develops 650 b.h.p. at 2,000 r.p.m. The comparative length and weight (1,320 lbs.) of this engine appears to make the extra 50 h.p. (as compared with the previously described engine) a somewhat doubtful advantage, or alternatively it shows the economy in weight of the monobloc design, each bank of cylinders in the larger engine comprising six separate units having sheet steel jackets welded to the barrels, the construction being similar to that of the early Rolls-Royce engines. The bore and stroke are 120 mm. and 180 mm., the compression ratio being 6:1. The airscrew shaft is gear driven through the epicyclic type of reduction gear previously mentioned, the ratio being the same, namely, 0.647:1. The arrangement of the auxiliary drives and valve gear is similar to that of the type 12 Ed. 12-cylinder 450 engine. The three gear-type oil pumps are, however, fitted at the rear end of the crankcase. Four Zenith carburettors are employed, these all being fitted outside the outer banks, those on the port side being of duplex type to supply the centre bank of cylinders, in addition to the port bank.

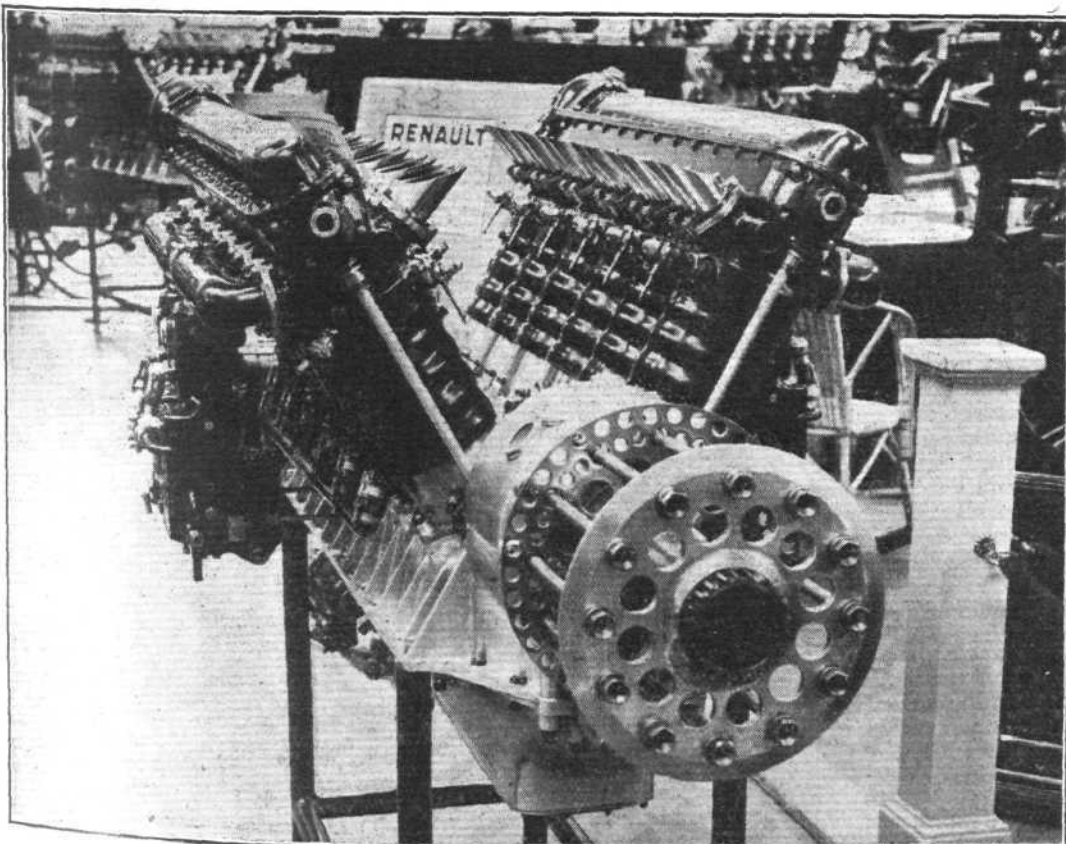
#### Renault

Six engines are being shown by the Renault firm on the Stand of the French combined exhibit, four being of the old twelve cylinder water-cooled, 60° V-type (two geared and two direct-driven), and two new air-cooled engines, one of which is a 250-h.p. nine-cylinder radial, whilst the other is an 80-h.p. four-cylinder-in-line air-cooled light 'plane engine. The last two are, of course, the more interesting of the group. The radial engine has a bore and stroke of 125 mm. and 150 mm. respectively, the normal output being 250 b.h.p. at 1,700 r.p.m., the airscrew being direct-driven. The cylinders are of composite construction, having steel barrels and aluminium heads, the valve seats being of bronze. Two inclined valves are fitted in each head, the inlet and

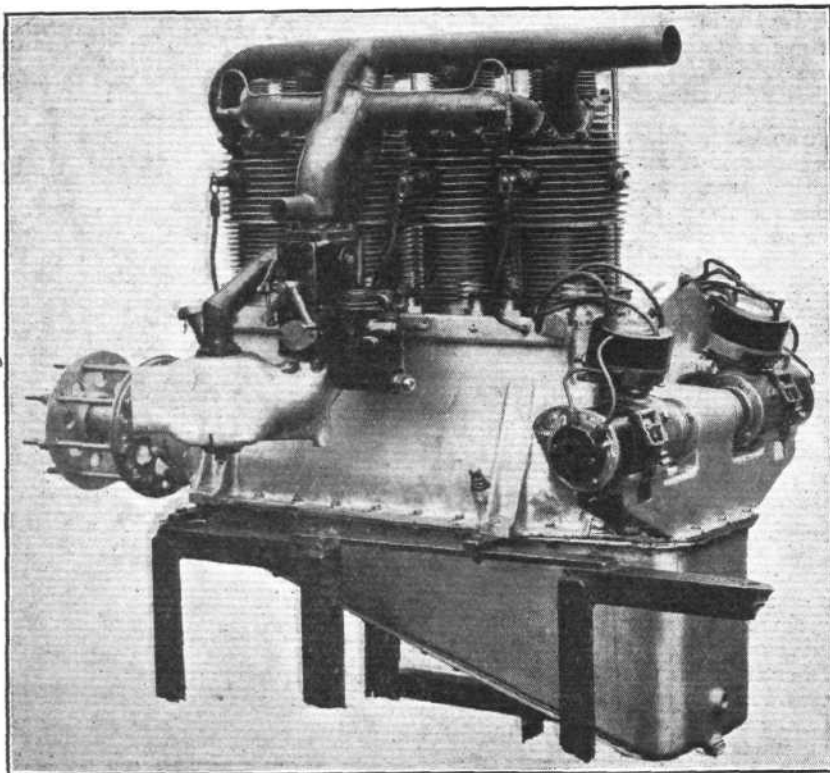


The new Renault 9-cyl. radial develops 250 h.p. at 1,700 r.p.m.

exhaust ports both facing rearwards. The valves and rockers are enclosed in duralumin housings which are bolted to facings provided on supports formed integral with the heads. Each rocker spindle is provided with a Tecalemit greaser which is fitted to an extension of the spindle, this forming a chamber holding a reserve of lubricant. The rocker housings are fitted with pressed detachable cover plates, which are secured by spring clips. The two sparking plugs are located horizontally



The 500 h.p.  
Renault  
geared engine



The Renault 4-cylinder in-line air-cooled engine develops 80 b.h.p. at 1,800 r.p.m.

in the head, diametrically opposite, at front and rear. The crankcase centre portion is made in one piece, the cam gear being housed in a separate casing. The two four-lobed cams rotate at one-eighth engine speed in the reverse direction to that of the crankshaft. The latter is in one piece and is supported by two roller bearings and one ball thrust bearing. The master rod big-end is of the split type, the rod being of H section, whilst the auxiliary rods are tubular.

The two S.E.V. magnetos are mounted transversely on brackets cast integral with the cam gear housing, the other auxiliaries being located at the rear of the engine. Lubrication is provided by two gear-type pumps, the scavenge pump passing oil to jackets surrounding the three induction pipes leading from the triple Zenith carburettor to the bottom of the induction chamber. The air intake is exhaust heated. Provision is made for the inclusion of a Viet gas-starting distributor. The weight of this engine is 550 lbs. complete.

The 80-h.p. model is a neat light 'plane engine, though at 319 lbs. it appears to be somewhat weighty. We understand, however, that the engine shown is not of the latest type, an improved model, which develops 100 b.h.p. for the same total weight, now being in production. The engine at Olympia has a bore and stroke of 115 mm. and 140 mm., the outputs being 70 b.h.p. at 1,700 r.p.m. and 80 b.h.p. at 1,800 r.p.m., the airscrew being direct-driven. The cylinders have steel barrels on which the duralumin heads are screwed and shrunk, the valve seats being of bronze. The cylinders are each secured to the crankcase by four clamp fittings, these engaging with a circular flange turned on the bottom of the barrel. The two vertical valves in each head are located on the fore-and-aft centre and are operated by duralumin rocker arms, these being fitted at the ends of a common spindle which is fixed in a duralumin bracket, this, in turn, being bolted to the head. The rocker spindles are lubricated by spring greasers, these being filled by a Tecalemit grease gun. The crankshaft is carried in five plain bearings, the housings

being fixed to the top half, the lower portion forming an oil base holding sufficient oil for a flight 10 hours' duration. The connecting rods are duralumin.

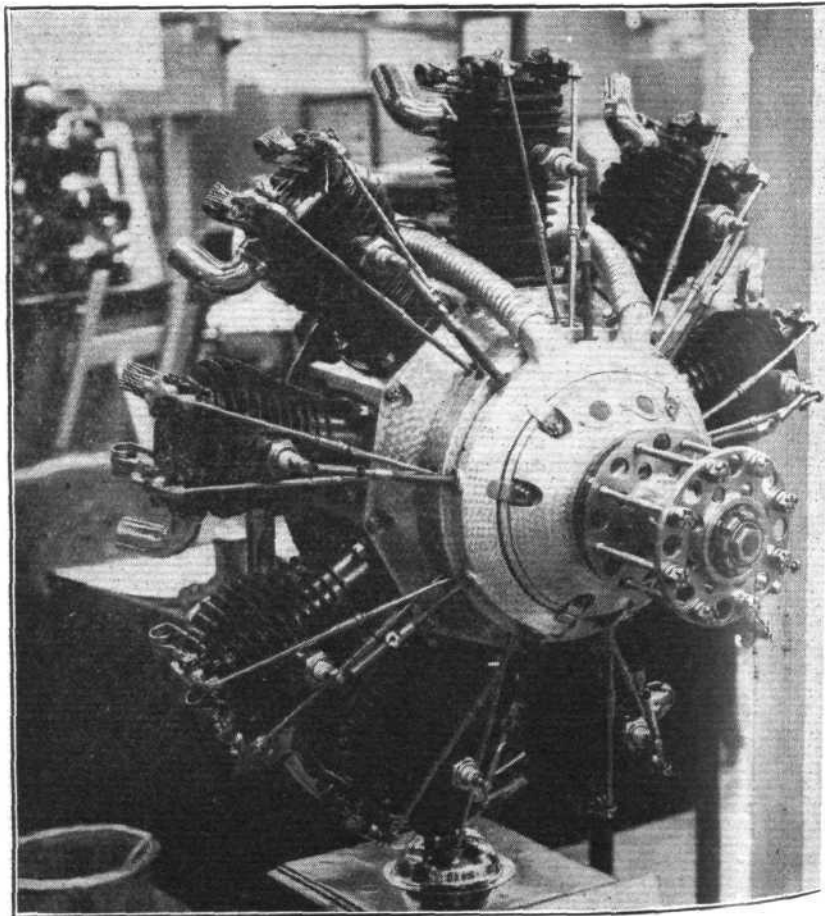
The induction pipe from the Zenith carburettor is exhaust-jacketed, the air intake also being exhaust heated. Two Ducillier magnetos driven by a cross shaft at the rear of crankcase.

Lubrication is on the wet sump principle, the pumps being of the gear-type; the distribution oil pipes are fitted within the crankcase.

In the water-cooled engines there is little interest, the four representing two classes on the 570-h.p. type 12 K.h., and the 550-h.p. type 12 K.g. being respectively the geared and ungeared versions of the 134 mm. bore and 180 mm. stroke series, whilst the other class (125 mm. 170 mm.) have normal powers of 500 h.p. and 450 h.p. in the geared and ungeared types respectively, these being designated the 12 Jb. type and the 12 Ja. type. The speed, power and other particulars of these engines will be found in Table. In each case the cylinder construction is of the separate unit type, with a common valve gear housing fitted to the heads, whilst the Zenith carburettors are mounted on the outer side of the cylinder banks. Four camshaft-operated valves are provided in each head, these being totally enclosed. The auxiliary drives are arranged in the conventional manner at the rear of crankcase. An interesting feature is that all the engines are provided with centrifugal oil purifiers. The crankshafts and big-end bearings are of the plain-bushed type. The weights of these engines are 1,165 lbs., 1,040 lbs., 890 lbs., and 815 lbs., in order of power.

#### SALMSON

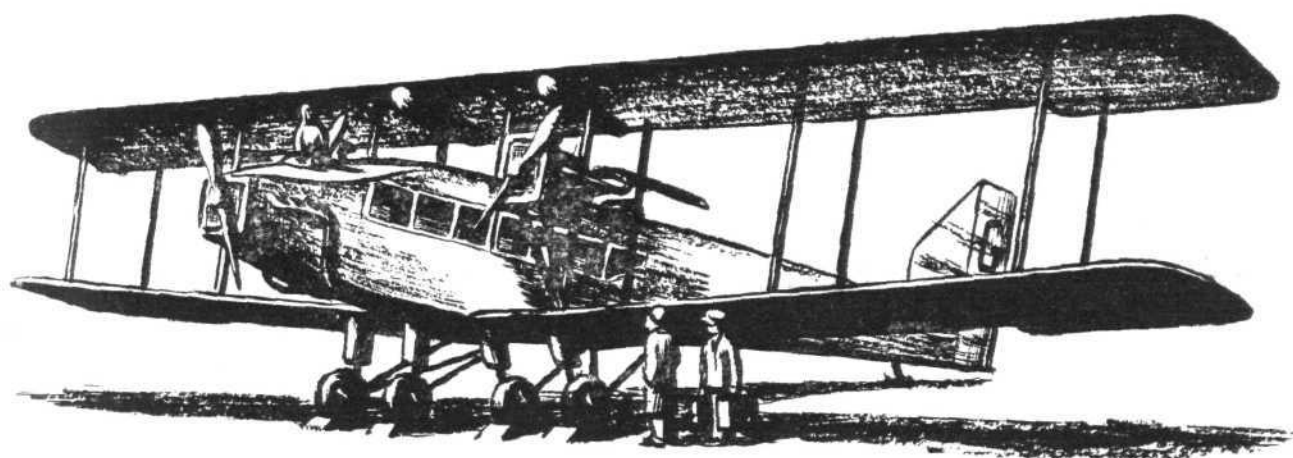
Six of the well-known air-cooled Salmson radial engines, being shown on the stand of the combined French exhibit, which three are nine-cylinder types, one is a startling "dup nine," one five-cylinder and one seven-cylinder engine completing the exhibit. All are direct-driven, normal



The Salmson type AD 9-cylinder radial develops 40 b.h.p.



# S.A.B.E.N.A.



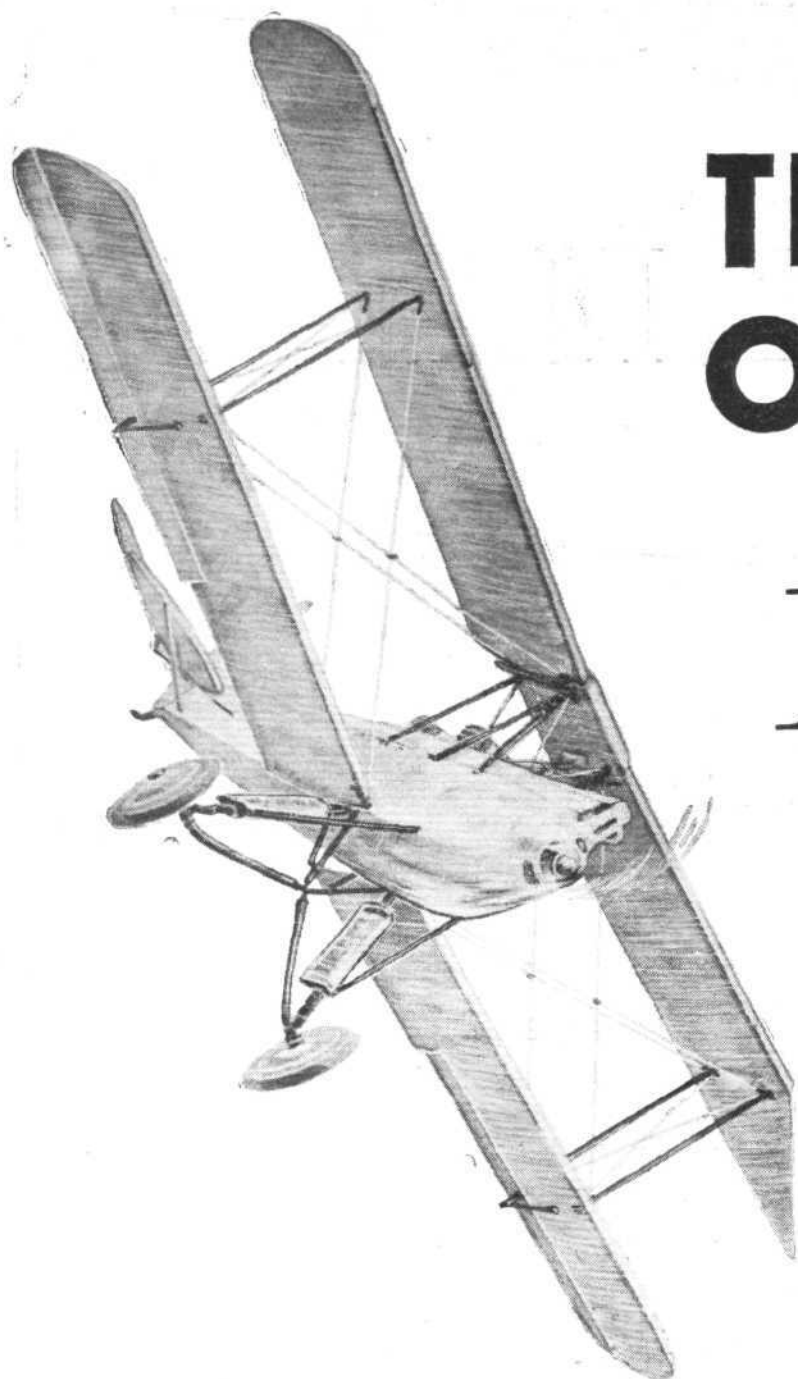
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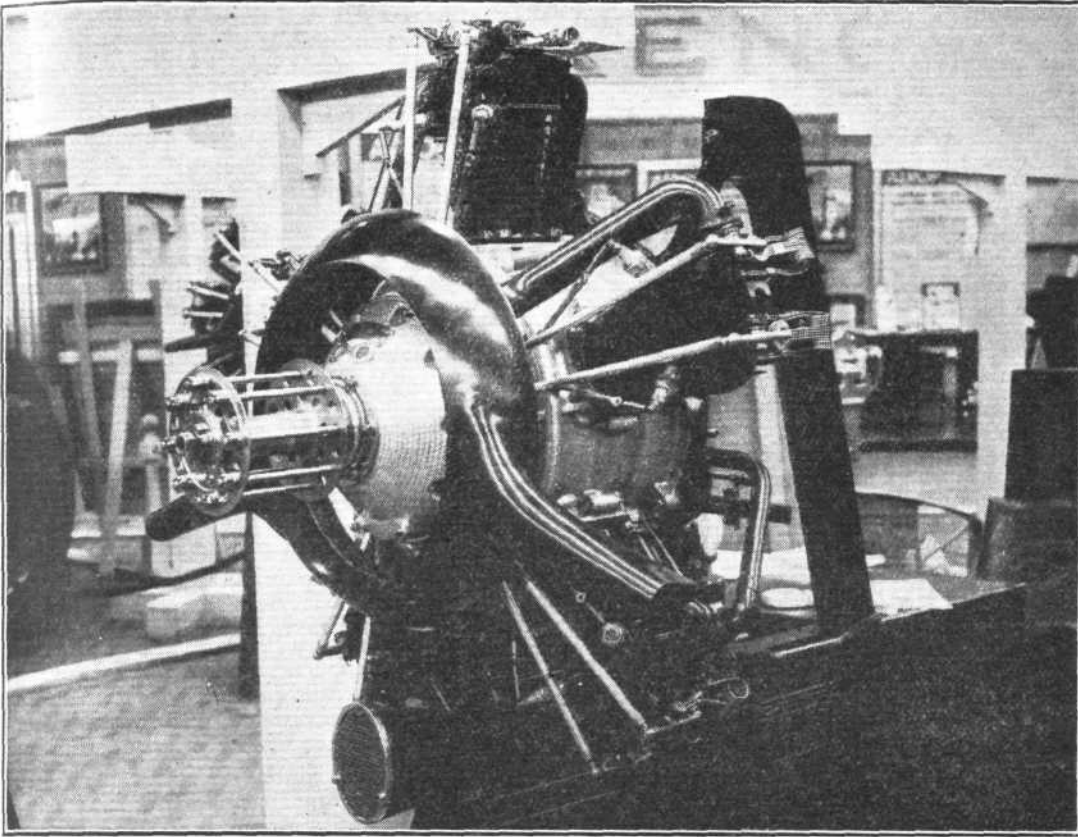


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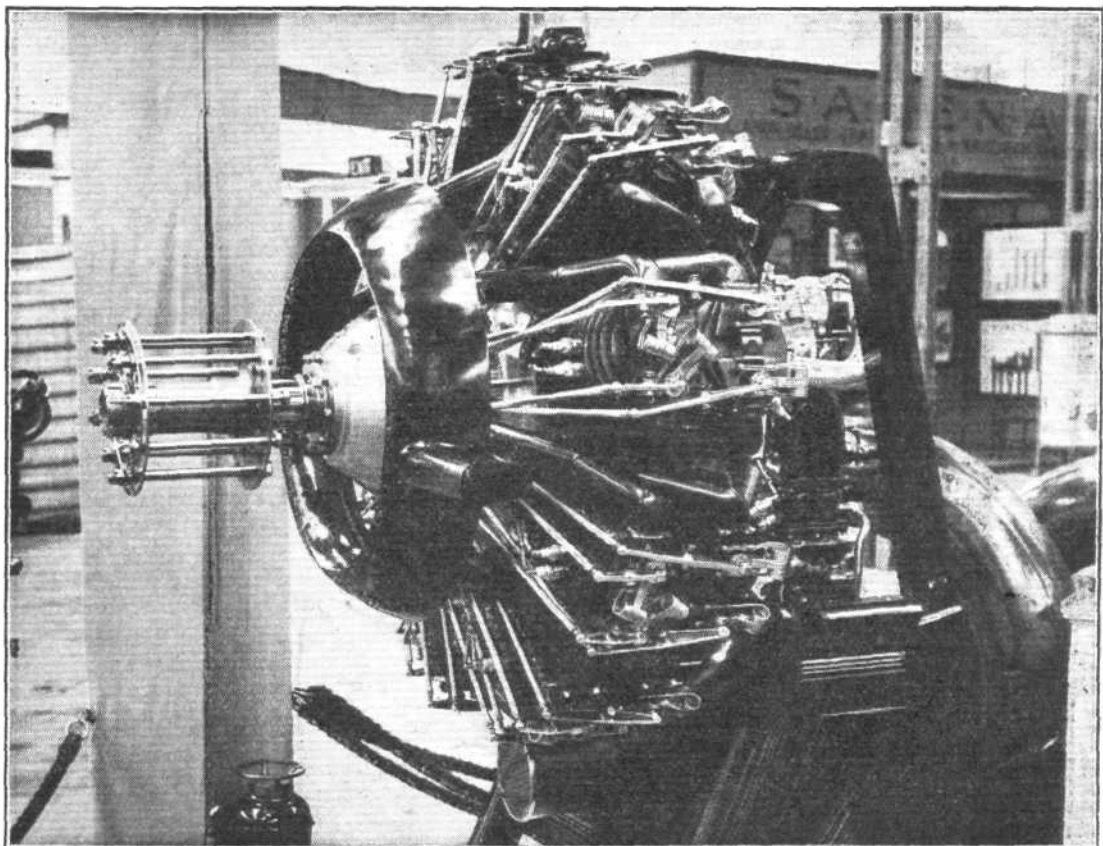
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The Salmson 5-cylinder radial engine, type 5 AC, develops 60 b.h.p.

aspirated engines. The nine-cylinder engines are of the AB ( $125 \times 180$  mm.), AC ( $100 \times 130$  mm.) and AD ( $70 \times 86$  mm.) types, the powers being 230, 120 and 40 h.p. respectively, whilst the five- and seven-cylinder engines are of the AC type having normal outputs of 60 and 95 h.p. respectively. The largest and perhaps the most interesting of the group is the 500 h.p. eighteen-cylinder type 18 AB. The normal output of this engine is developed at 1,700 r.p.m., the maximum output being 550 b.h.p. at 1,750 r.p.m. The makers claim that this is the highest powered air-cooled engine of French design yet built. This engine has a diameter of 48 in. and weighs 990 lbs. The bore and stroke are 125 and 180 mm. respectively, the compression ratio being 5.2 : 1.

The cylinder construction of each engine comprises a steel barrel and combustion head fitted with a deeply finned "poultice" type aluminium outer head, which extends some distance down the barrel. These aluminium heads are fitted in an extremely neat manner, the exact method of assembly apparently being a secret process. In the eighteen-cylinder engine the front and rear cylinders are arranged in tandem, each pair being secured to the crankcase by a common flange. As they are not staggered but are fitted closely together in line the cooling of the rear group of cylinders would appear to be somewhat inefficient, especially as the fins on the adjacent portions of each pair of cylinders are cut away to allow the axes of the bores to be placed as closely together as possible.



The Salmson type 18 AB is an 18-cylinder radial, with a maximum power of 550 b.h.p.



(the heads, in fact, are "Siamesed"), a further unusual feature being that the master connecting rods of each group of cylinders are mounted on a common crankpin, the crankshaft having one throw only, with balance weights fitted to extensions of the crank webs.

The arrangement of the valve gear is interesting; two inclined valves are provided in each head, the inlet and exhaust ports being located one at each side. The four rockers, two for each cylinder, all have their pivot brackets mounted on a common steel platform, which is supported clear of the head of the front cylinder by four long bolts, the inner ends of which are secured to a ring clamped around the lower part of the barrel, below the bottom fin. The effect of the cylinder "growth" on the tappet adjustment is thus reduced to the minimum. The rockers operating the valves of the rear cylinders are, of course, considerably longer than is usual. The characteristic horizontal coil valve springs (of a type somewhat similar to those known as the "hair-pin" type) peculiar to Salmson engines considerably reduces the length of the valve stems and hence the length of the cylinder, or the overall diameter of the engine. On the large engine the mixture is supplied by two separate duplex carburettors, one at each side of the auxiliary drive housing, to an annular induction chamber formed in the rear portion of the crankcase, from which the branched induction pipes lead between the cylinders to the intake sides of the heads. The common air intake for the two carburettors is exhaust jacketed. The exhaust pipes are led forward into a common collector ring. Ignition is provided by two Salmson H.T. magnetos, the two plugs of the front group of cylinders being fitted side by side at the front of the heads, whilst those of the rear cylinders are similarly arranged at the rear of the head. Lubrication is supplied by two gear-type pumps, one pressure and one scavenge. A gas starter distributor is fitted at the rear of the crankcase between the magnetos.

At the opposite end of the Salmson range, the 40-h.p. type 9 AD engine, perhaps comes next in interest. The overall diameter of this miniature nine-cylinder radial engine is 27 in. only. It has been adopted as standard by the builders of several Continental light 'planes and is now being supplied to the United States in large numbers. The weight is 154 lbs. and the normal output is attained at a speed of 2,000 r.p.m. The compression ratio is 5.6:1. One of the outstanding feats of this engine, accomplished three years ago, was a Paris-Warsaw non-stop flight. It also holds a number of French records for light 'planes. The design follows standard Salmson practice on a reduced scale. All the auxiliary drives are located at the rear of the crankcase, and on the engine shown one magneto only is fitted, this supplying one plug per cylinder, but for the British and American markets the

makers are now producing these engines with two magnetos, each of approximately half the weight of the one at present fitted, thus providing the required dual ignition. A twin-choke carburettor is fitted directly to the induction casing.

The 9 AB type engine has a bore and stroke of 125 mm. and 170 mm. respectively, and a compression ratio of 5 or 5.4:1. It has a normal output of 230 b.h.p. at 1,700 r.p.m., the weight complete being 585 lbs. The construction is typical Salmson throughout.

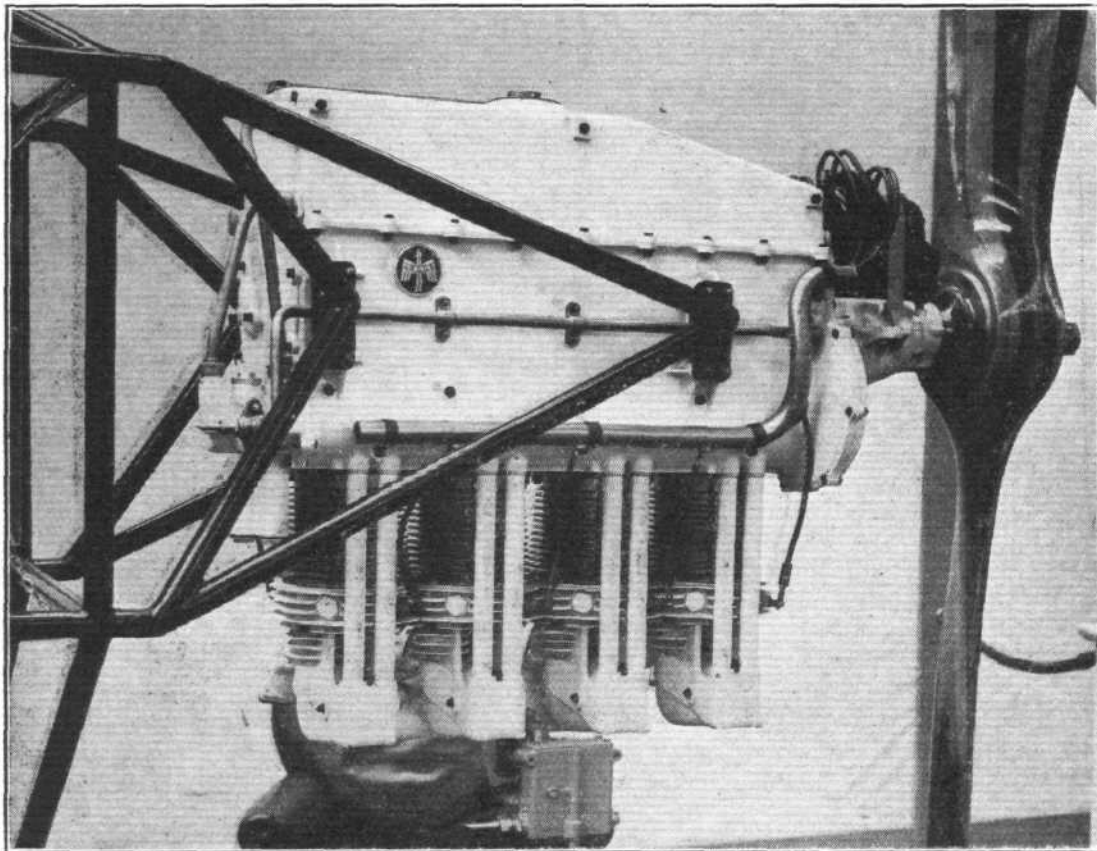
The 9 AC type has a bore and stroke of 100 mm. and 130 mm. respectively, with a similar compression ratio to the 9 AB, the normal output being 120 b.h.p. at 1,800 r.p.m. The weight is 373 lbs. complete. The 5 AC and 7 AC types are respectively five and seven-cylinder versions of the last-mentioned engine, the compression ratio being the same and the cylinders, pistons and all valve parts being interchangeable. The normal outputs are 60 and 95 b.h.p. at 1,800 r.p.m., the weights being 242 lbs. and 286 lbs. respectively.

## GERMANY.

GERMANY is represented by two engine firms only, Argus and Mercedes-Benz, although two other German makes of engines are actually at the Show, installed in aeroplanes. The Argus firm are showing a light air-cooled four-in-line engine, whilst on the British Mercedes-Benz Stand are being shown one very large, 1000-h.p. engine and, by way of contrast, a 20-h.p. light 'plane engine. The other two engines referred to are a Siemens-Halske five-cylinder air-cooled radial of the Genet type, this being fitted in the little B.F.W. low-wing monoplane, and a 500-h.p. B.M.W. VI twelve-cylinder water-cooled V-type engine fitted in the Heinkel seaplane. Unfortunately, no details of these two engines are available. It was noted, however, that the small air-cooled engine was fitted with volute-type valve springs and that hardened rollers were fitted to the ends of the rocker arms in contact with the valve stems.

### Argus

The Argus is a direct-driven inverted four-cylinder-in-line, air-cooled engine, and is the only one of its type at Olympia. One of the most interesting features of this engine is that it develops its full power at an unusually low crankshaft speed. The normal output is 75 b.h.p. at 1,350 r.p.m., whilst the maximum power of 80 b.h.p. at 1,400 r.p.m. may be maintained indefinitely without damage. The bore and stroke are 120 mm. and 140 mm. respectively, and the compression ratio 5.3:1. The weight of this engine is stated as being 247 lbs. which seems remarkably low in view of its robust appearance. The cylinders are of composite construction having aluminium heads bolted to steel barrels, the valve seats and guides being



The Argus 4-cylinder in-line inverted engine develops a normal power of 75 b.h.p. at 1,350 r.p.m.

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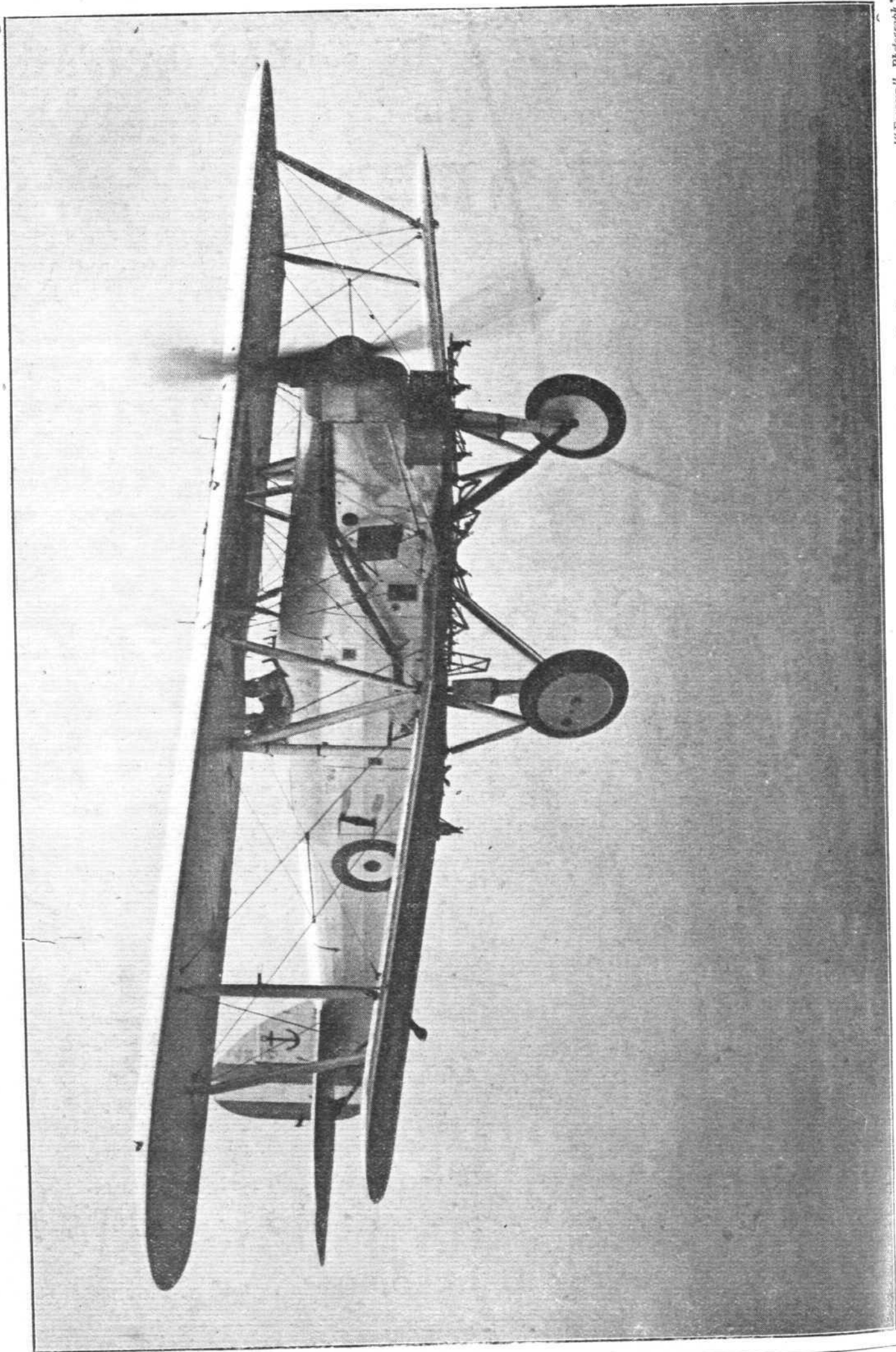
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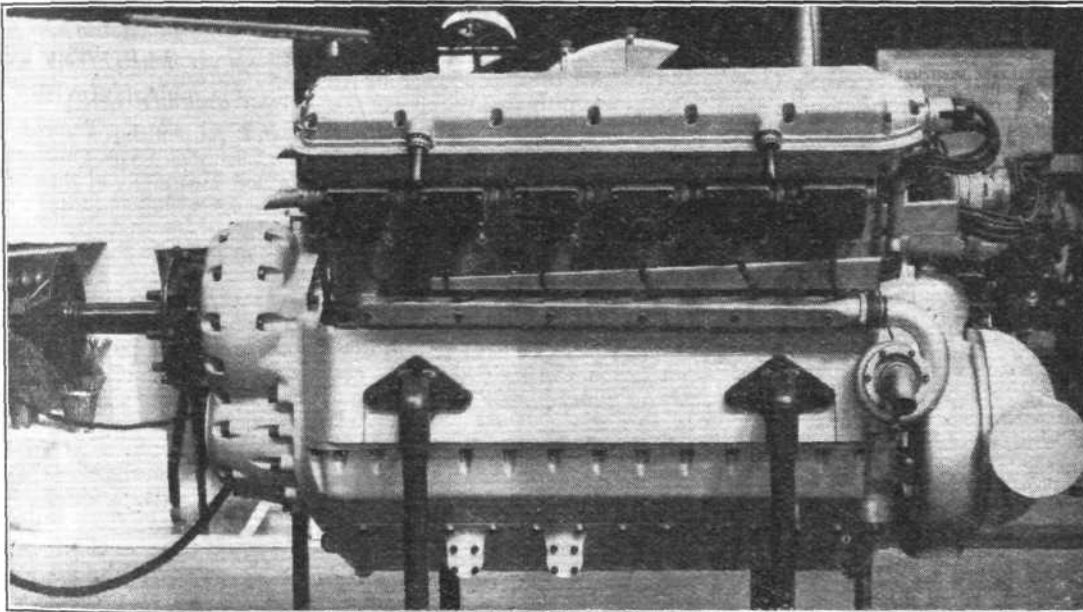
of bronze. The valves and rocker gear are totally enclosed in substantial housings, the fixed portion of the housings being cast integral with the heads. The inlet and exhaust ports are located at the same side of the head, the valves being arranged on the fore and aft centre line of the cylinders. The cast aluminium manifold is of the branched type and has a "hot-spot" connection to the similarly cast exhaust manifold. The crankcase is of Electron alloy, which probably accounts for a considerable portion of the weight saved. It is not divided on the centre line of the crankshaft but above this, the top portion forming a tank having an oil capacity which is sufficient for a six hours' flight. Dry sump lubrication is provided, one pressure and two scavenge pumps being fitted. The crankshaft is carried in six bearings, the foremost supporting the crankshaft extension, on which the airscrew hub is mounted, and forming the thrust bearing. The two Scintilla magnetos are mounted one at either side of the forward extension of the crankcase, with their distributors facing rearwards. A Sum carburettor supplies the mixture to the branched manifold previously mentioned.

#### Mércèdes-Benz

This firm is showing one example from each extreme of the scale, namely, the 1,000 h.p. type F.2 supercharged

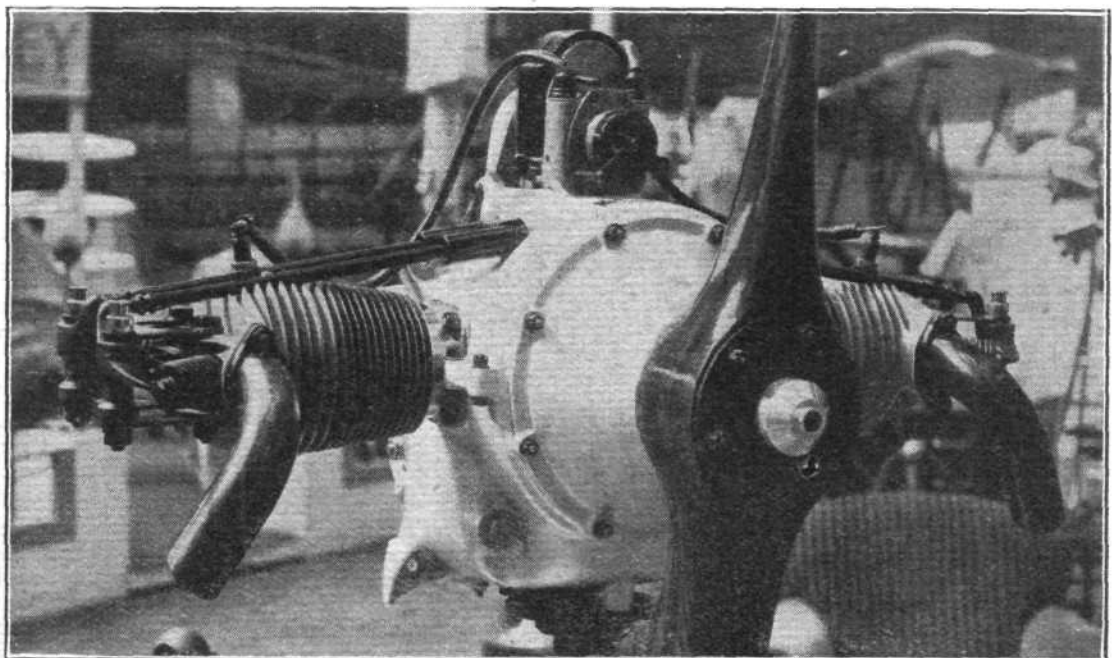
engine, and the little twin-cylinder air-cooled horizontal opposed type F.7502 light 'plane engine. The large engine is of the geared 12-cylinder water-cooled 60° V. type, in which the cylinders form separate units, having welded-on sheet steel water jackets. The bore and stroke are 165 mm. and 210 mm. respectively. The engine develops 800 h.p. at 1,500 r.p.m., when normally aspirated, or 1,000 b.h.p. at 1,700 r.p.m. with the compressor in operation. The supercharger is of the usual Mércèdes controlled form, as applied to the cars of that make. It is the only one of its type in the show, as it is fitted "before" the carburettor, i.e., its function is to supply air under pressure to the carburettor instead of drawing carburetted air and supplying it under pressure to the cylinders, as in other types of superchargers to be found at Olympia. The engine is provided with a dynamo and electric starting motor (this not being fitted to the engine shown), and with these accessories weighs 1,800 lbs. or 1,650 lbs. if directly driven. The reduction gear is of the spur type and provides a ratio of 0.51 : 1.

Four valves are provided in each cylinder head, two inlet and two exhaust, the valve gear being totally enclosed by aluminium covers and lubricated under pressure. The crankcase is of Electron and is so constructed that inspection is facilitated by the removal of a tray fitted at the bottom.



The Mércèdes-Benz 1,000-h.p. type F.2 is a super-charged and geared engine.

At the other end of the scale : the little flat twin Mércèdes engine develops 20 b.h.p. at 3,000 r.p.m.



Roller main and big-end bearings are employed. The fuel is fed to the four Mercedes-Benz carburettors (which are mounted between the banks of cylinders) by two fuel pumps, the output of these being such that with one only working the feed is sufficient to ensure the proper working of the engine. The carburettors are of the floatless type, and do not therefore tend to flood. The air compressor may be started from the pilot's cockpit and increases the engine output by about 20 per cent. at ground level, and compensates for the reduction in air density with altitude in the usual manner.

Dual ignition, by coil and magneto, is provided by the battery-charging 200-watt dynamo and coil system, and by a single Bosch magneto. An inertia centrifugal starter is provided which may be operated by the battery or by means of a handle; provision is also made for compressed air or gas starting.

The Mercedes-Benz twin-cylinder 20 h.p. air-cooled engine, which is of extremely neat appearance, is the smallest engine in the show, the bore and stroke being 75 mm. and 100 mm. respectively. The cylinders are of composite construction, the barrels being of steel whilst the heads are of grey cast iron. The fitting of the cylinders is unusual in that they are screwed into the crankcase. Each cylinder head is provided with four inclined valves, two inlet and two exhaust, the rocker spindles of which are fitted vertically. The camshaft is driven by spur gearing, and is located in the upper part of the crankcase. The mixture is supplied by a Mercedes-Benz carburettor, the air being drawn through a heater formed in the crankcase. Forced lubrication is provided by means of a gear pump located in the bottom portion of the crankcase, this receiving a constant supply of fresh oil from a small piston pump. The crankshaft is supported by two roller bearings in the crankcase. The air screw is driven through a planetary type reduction gear which provides a ratio of 0.33:1. The output of 20 b.h.p. is obtained at a normal crankshaft speed of 3,000 r.p.m. Ignition is provided by a single Bosch magneto mounted on the top of the crankcase, the magneto supplying one plug per cylinder. The weight of this little engine is 105 lbs.

## ITALY

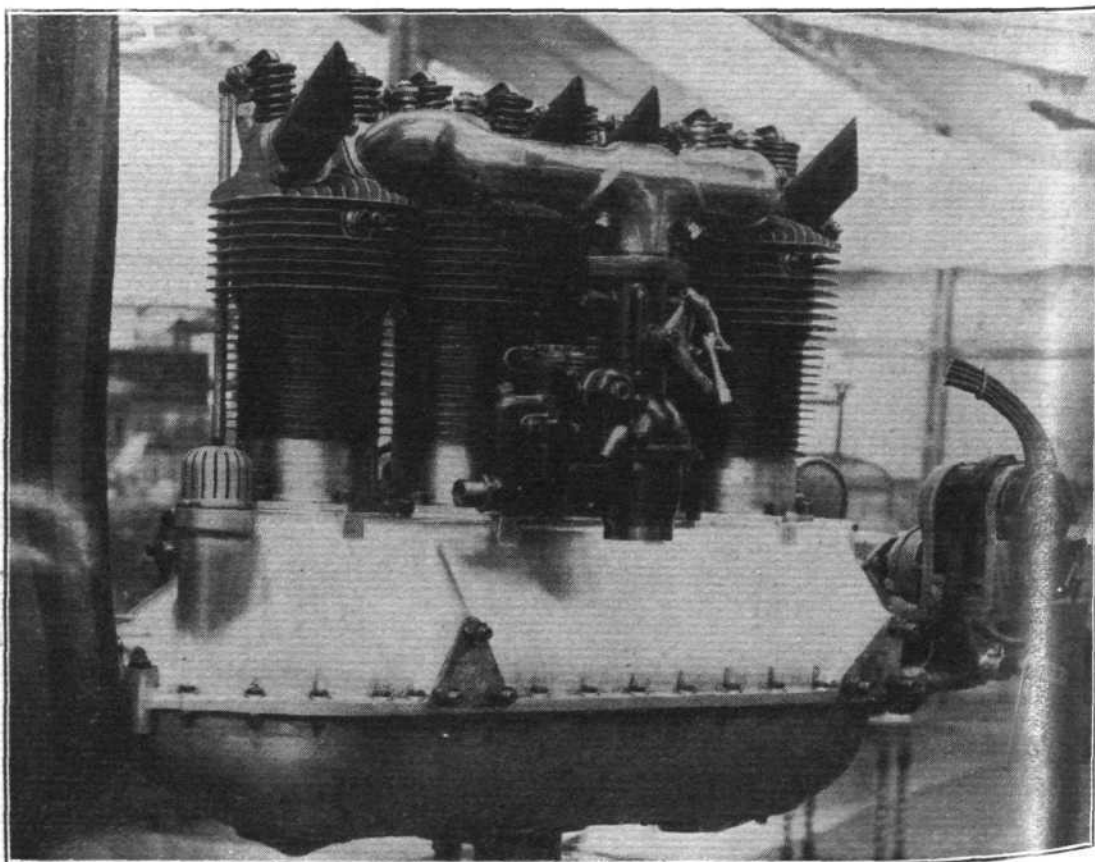
THE products of four Italian aero engine firms are being shown, the engines totalling eight, divided as follows:—Colombo (one air-cooled), Fiat (one air-cooled and two water-cooled), Fuscaldò (one air-cooled), Isotta Fraschini (one air-cooled and two water-cooled).

### Colombo

This firm is showing on the stand of the Italian Air Ministry a small four-cylinder in-line air-cooled engine

suitable for installation in light aeroplanes. The type S.53, as it is called, has a rated output of 85 h.p., the actual normal output being 87 b.h.p. at 1,700 r.p.m., whilst the maximum output is 94 b.h.p. at 1,900 r.p.m., the airscrew being directly driven. This engine is of orthodox design, but has the remarkably low weight of 228 lb., including the airscrew hub. To afford a fair comparison, however, with other engines of this class there should be added to this weight that of the oil supply tank and tank supports, piping, etc., as the Colombo S.53 engine has a dry sump lubrication system. With this allowance made, however, the weight/power ratio remains lower than usual, which is particularly meritorious in view of the fact that the engine has been designed to be run and maintained by the owner-pilot and to use ordinary grade motor fuels, the compression ratio being 5:1. The cylinders have a bore and stroke of 114 mm. and 140 mm. respectively. They are of composite construction, having steel barrels to which the aluminium heads are screwed and shrunk, the supports for the rocker brackets of the two inclined valves being cast integral. The valves are located on the fore-and-aft centre line of the cylinders, the inlet and exhaust ports being both located on the port side. The valve seats, guides and sparking plug adapters are of bronze, the latter being located horizontally in the sides of the head, diametrically opposite each other. The cylinders are secured to the crankcase by flanges formed integral with the barrels. The crankcase is a magnesium aluminium alloy casting, divided on the crankshaft centre line. The crankshaft is carried in five white-metal lined plain bearings, the caps of which are secured to the upper portion of the crankcase. The thrust bearing provides for the fitting of a propeller or tractor airscrew. The pistons are aluminium alloy pressure castings and are fitted with two compression rings and one scraper ring. The one pressure and two scavenge gear-type oil pumps are driven respectively by the top and bottom ends of a vertical spindle located at the centre of the camshaft, by which it is driven through a skew gear. Oil is fed under pressure to each of the crankshaft bearings and passes thence through the webs to the crankpins and big-ends, the camshaft and tappets being lubricated by splash from the latter. Two sumps and filters are provided, one at each end of the crankcase, each being drained by an external pipe and separate pump. The magnetos are driven by a cross-shaft located at the rear of the engine, this shaft being driven by a skew gear on one of the timing gear wheel spindles. One magneto is fitted with an impulse starter. A choice of Marelli, Bosch or Scintilla magnetos is offered. A Zenith carburettor is fitted, and this may be warm oil or exhaust jacketed as desired.

The Colombo 4-cylinder, in-line air-cooled engine, type S.53, develops its normal power of 87 b.h.p. at 1,700 r.p.m.



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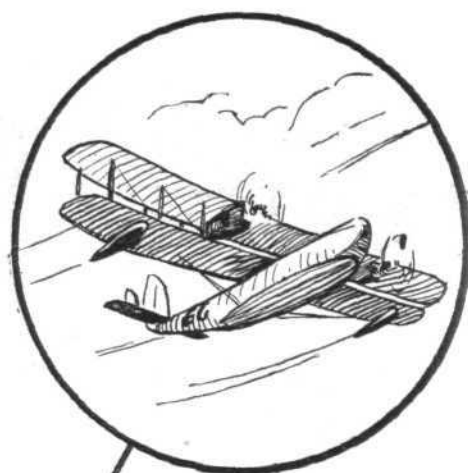
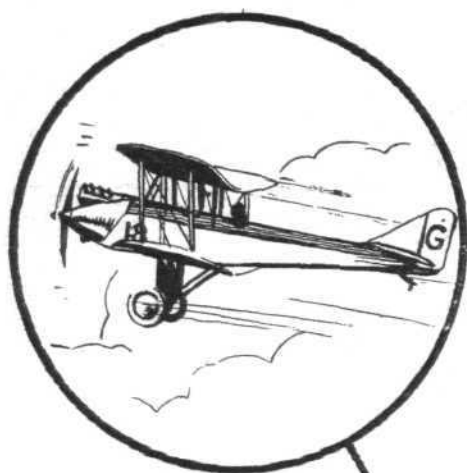
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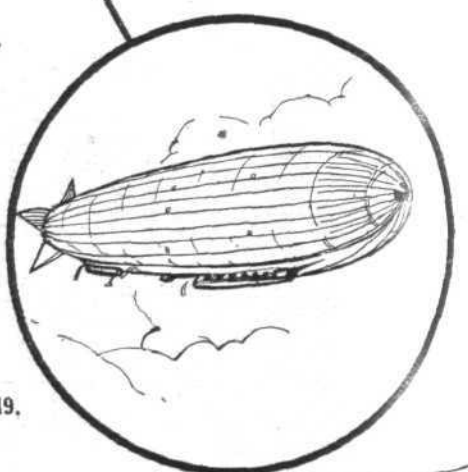
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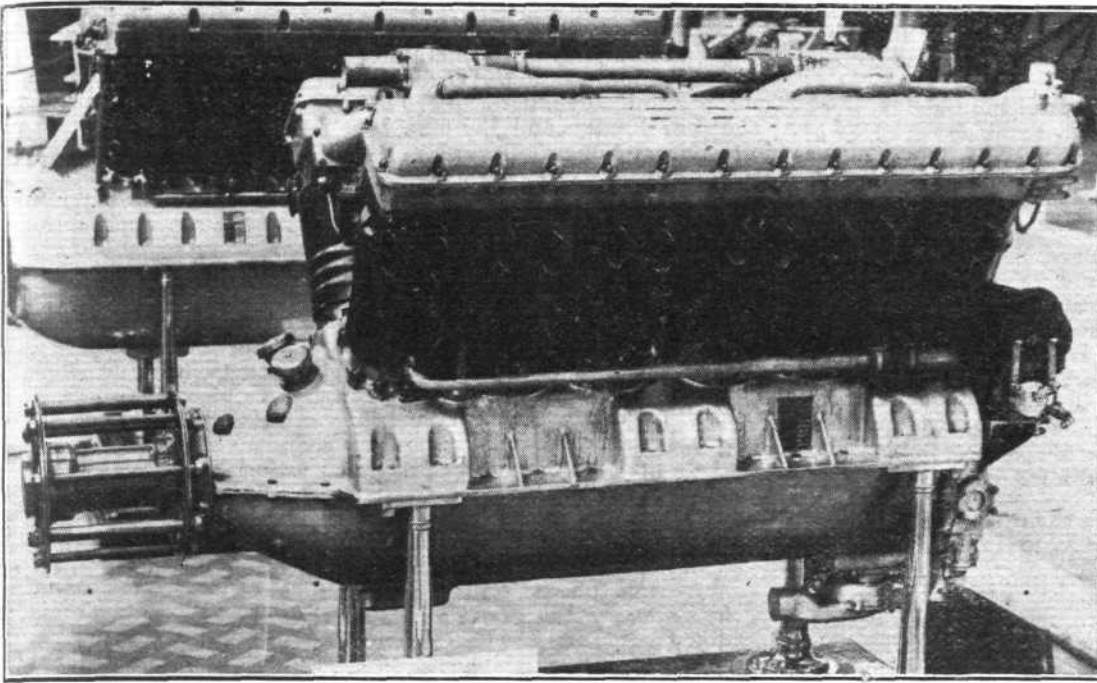
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The Fiat A.22 engine is holder of the world's long-distance record (Rome-Brazil).

#### Fiat

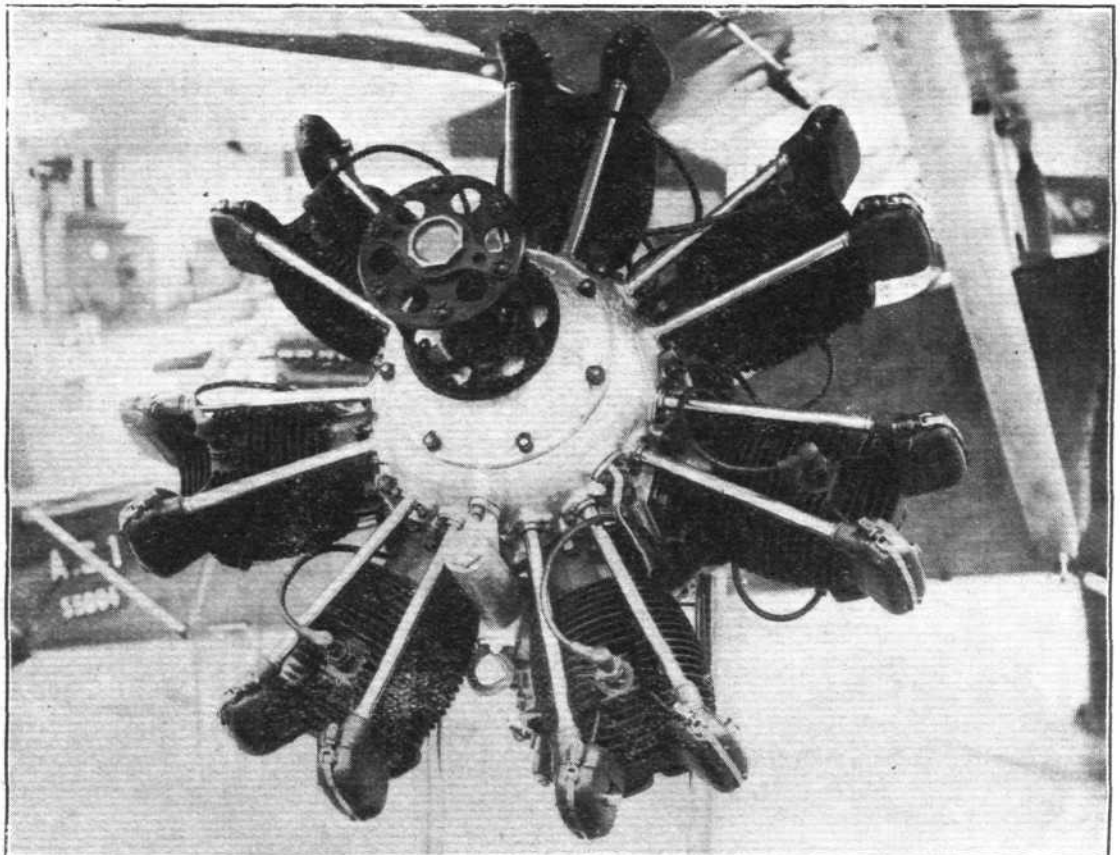
Three Fiat engines are being shown on the Fiat Stand and one in the Romeo monoplane shown on the Stand of the Italian Air Ministry. The engines shown on the Stand are the A 25 1,000 h.p. twelve-cylinder water-cooled 60° V type, the 600 h.p. 22, also a twelve-cylinder water-cooled 60° V engine, and the A 50, a 90-h.p. seven-cylinder radial air-cooled engine of attractive appearance, this being the type of engine fitted in the Romeo monoplane previously mentioned.

The two water-cooled engines have a direct-drive and are of similar appearance, one being an enlarged version of the other. They are of orthodox design and construction, the only unusual feature (for a Continental make) being that the carburettors are located between the banks of cylinders. Three Fiat water-jacketed carburettors are fitted on the larger engine and two on the smaller. In each case separate cylinder construction is employed, the jackets being formed by welded-on sheet steel casings. The heads and valve ports are formed integral, the common aluminium casing fitted to

the tops of the heads housing the twin camshafts and valve gear only; four valves per cylinder are provided. The auxiliary drives are encased in a very clean housing at the rear end of the crankcase, the two Marelli magnetos being mounted horizontally, one on either side, whilst the water pump casing is bolted to the bottom of the crankcase. The vertical spindle of the water pump is driven by a shaft fitted parallel to the vertical shaft mounted below the timing gear, the rearmost shaft driving the oil pumps. The camshafts are bevel driven by the usual inclined shafts, these being totally enclosed. A gas starter distributor housing is fitted between the lower ends of the inclined shaft casings. The large engine is provided with four sparking plugs per cylinder. The crankshafts of these engines are carried in seven plain bearings, the big-ends also being of the plain split-bushed type.

The A 22 engine is famous as the holder of the world's long distance non-stop record (Rome-Brazil). It has a bore and stroke of 135 mm. and 160 mm. respectively, and develops a normal output of 570 b.h.p. at 1,900 r.p.m. and a maximum

The Fiat A.50 is a 7-cylinder radial air-cooled engine. The normal power is 90 b.h.p. at 1,600 r.p.m., and the maximum 100 b.h.p. at 1,800 r.p.m.



output of 620 b.h.p. at 2,100 r.p.m. The compression ratio is 5.5:1. The dry weight, complete with airscrew hub is 1,004 lbs., this being reduced to 914 lbs. if provided with a crankcase and valve casings of Electron alloy, this being supplied to special order.

The type A 25 has a bore and stroke of 170 mm. and 200 mm. respectively, the compression ratio being 5.25:1. The normal output is 950 b.h.p. at 1,700 r.p.m., the maximum output being 1,000 b.h.p. at 1,900 r.p.m. The dry weight of this engine is 1,854 lbs.

The type A 50 air-cooled radial engine has been developed for use in private touring 'planes. It has an output of 90 b.h.p. at 1,600 r.p.m., the maximum output being 100 b.h.p. at 1,800 r.p.m., the airscrew being directly driven. The bore and stroke are 100 mm. and 120 mm. respectively, the compression ratio being 5:1. The cylinder barrels are of steel and are fitted with cast aluminium finned radiating outer casings, the whole of the radiating surface, excluding the plain turned portions of the barrels, being formed by these casings. The cylinders are secured to the crankcase by flanges and studs. The main portion of the crankcase is split on the plane containing the centres of the cylinders and all the auxiliaries are fitted at the rear. The main oil filter is accessibly fitted at the bottom of the front portion of the crankcase between the two bottom cylinders. The two inclined valves of each cylinder and their rockers are housed in very neat streamlined cases, these being fitted with easily detachable but oil-tight covers, which are each secured by a strap fitting to the lower portion of the case, this being made integral with the head casting. Into the side of each cover is fitted a grease gun nipple. The weight of this engine is 275 lbs.

#### Fuscaldo

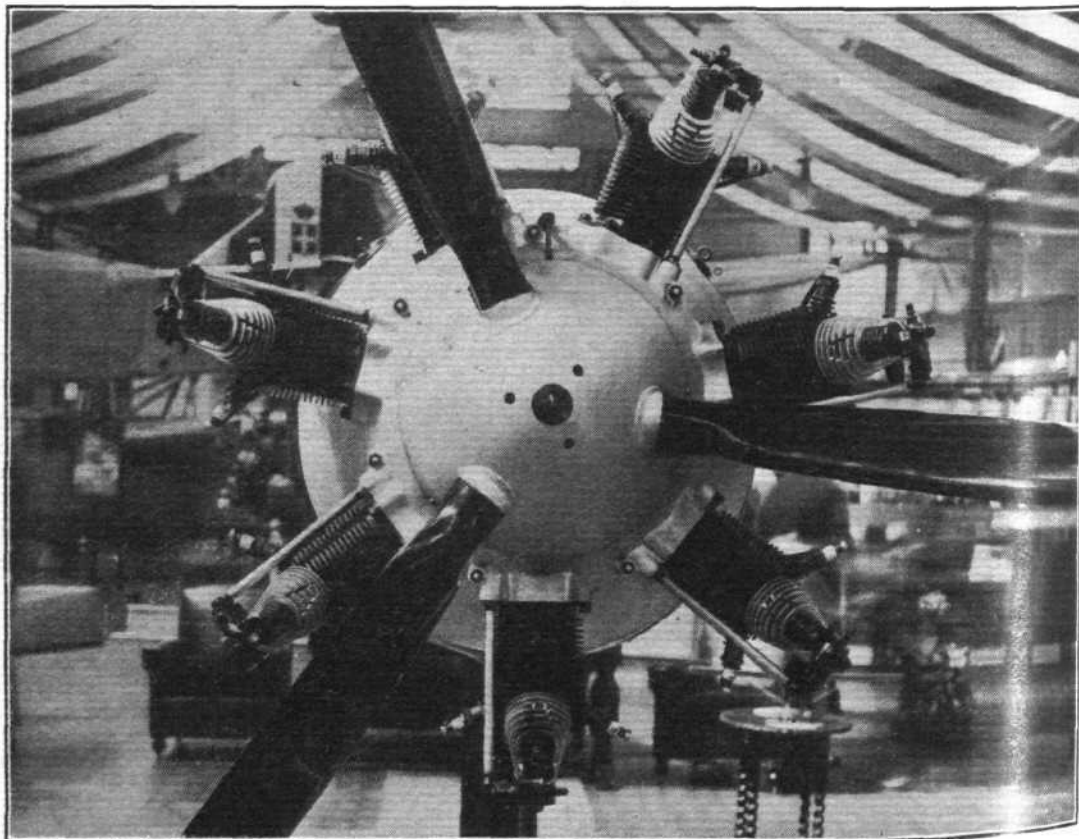
One of the most interesting of the foreign engines at the Show is the little Fuscaldo so-called constant-power, 90-h.p., seven-cylinder, radial air-cooled engine. As may be seen from the illustration, this engine is of attractive appearance and owes much of its neatness to the fact that the crankcase and spinner covering the boss of the three-bladed variable-pitch airscrew are designed as a unit, a further point of interest being that the rear portion of the outer wall of the crankcase is extended back to form the mounting and also the oil tank, the oil space being provided by an end and inner wall, the latter being arranged eccentrically to the outer wall, with the greatest depth at the bottom. The engine and oil tank thus forms in itself a complete streamlined nose fitting for a fuselage of circular cross-section, the only excrescences being the projecting portions of the cylinders, no cowling being therefore required. All the auxiliaries,

including the carburettor, are housed within the circular compartment surrounded by the oil tank at the rear of the crankcase proper, the intake for the carburettor being provided by a vertical air shaft located at the bottom of the oil-tank casting. The engine is made in three-, five-, seven- or nine-cylinder types, all having interchangeable cylinders of 90-mm. and 120-mm. bore and stroke respectively. The interchangeability of parts of the engines fitted with the different numbers of cylinders is stated by the makers to be 90 per cent. The seven-cylinder engine exhibited has the vertical cylinder at the bottom, and has a normal output of 90 b.h.p. at 2,500 r.p.m., this power and speed being maintained constant up to 10,000 ft. by means of the combined effects of a gear-driven supercharger and the variable-pitch metal airscrew.

It is well known that the full benefit of a supercharger cannot be obtained on an engine fitted with an airscrew of constant pitch, as the speed tends to increase with increase in altitude (the power being maintained constant by the supercharger), and therefore seriously affecting the engine and airscrew efficiency. In the type of airscrew fitted to the Fuscaldo engine the blade angle may be varied at will by the pilot during flight, so that he may maintain the engine speed, as well as its power, constant. The adjustment of the blades is effected by means of a bevel wheel fitted over the driving shaft at the rear of the airscrew boss, a bevel pinion at the root of each sheet-steel blade meshing with the main bevel, so that the pitch of the blades may be changed by rotating the controlling bevel. The rotational movement of the control bevel relative to its driving shaft, during the rotation of the latter by the engine, is obtained by mounting it on a helically splined sleeve which is itself splined internally to slide longitudinally on the driving shaft, the bevel wheel being restrained from longitudinal movement as the sleeve slides axially through it. The axial movement of the control sleeve is effected by a pivoted forked member, the arms of which are fitted with rollers, these being located in a groove formed on the control sleeve, the arrangement being similar to the usual clutch-withdrawing device of a car. The movement of the fork is controlled by the pilot through a push-and-pull rod operated by a hand wheel and screwed shaft in the cockpit, the whole mechanism being, of course, absolutely irreversible. An interesting feature is that the blades may be turned through their "neutral" position to provide a reversed pitch, so that the airscrew may be used as a very effective form of air brake on landing.

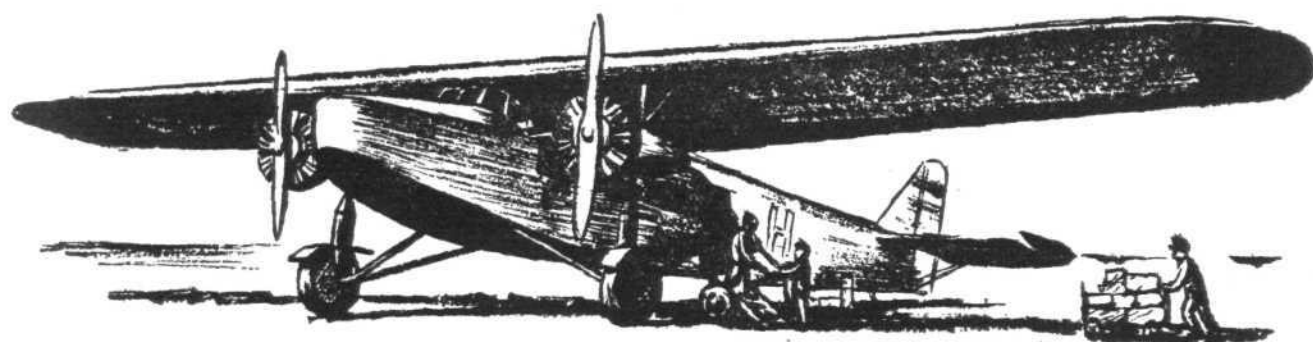
Reverting to the engine itself, this literally bristles with novel features, for the cylinders themselves are of unusual design. The hemispherical combustion heads are made integral with the steel barrels, the two valves (set at 90°

The Fuscaldo 90-h.p. engine has a gear-driven supercharger and a variable-pitch airscrew.





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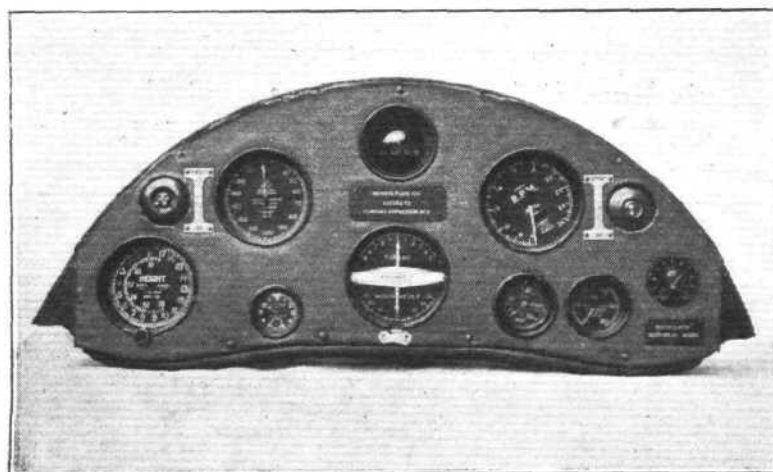
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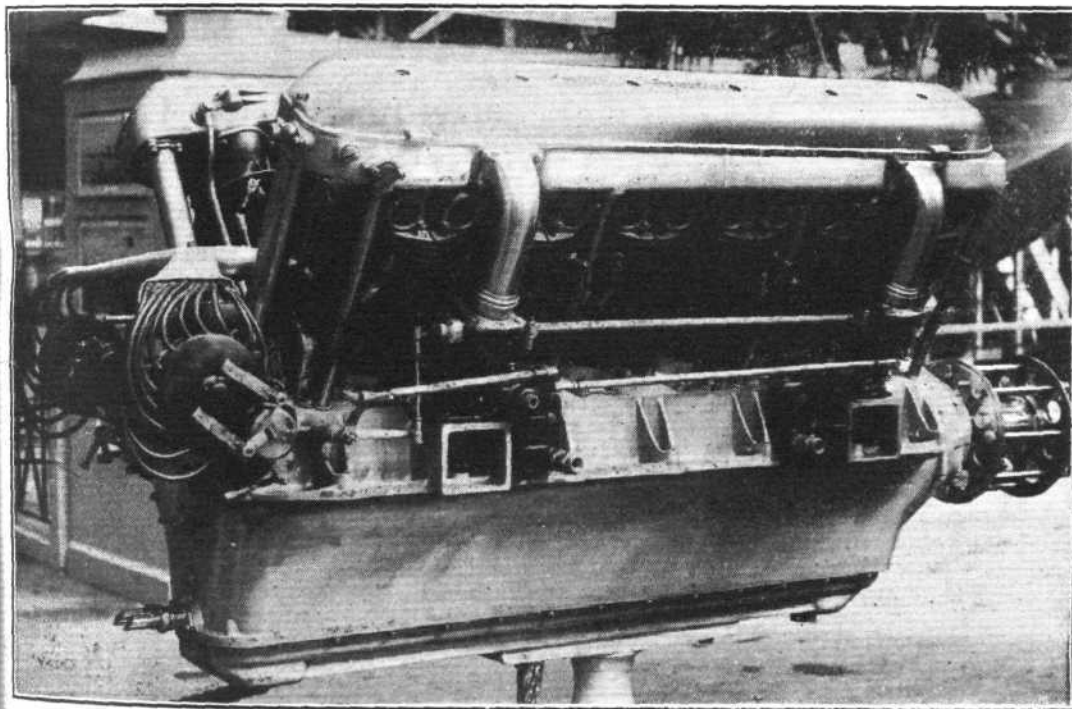
on the fore-and-aft axis) and their seats and ports being carried by separate detachable units, the inlet being at the rear. These valve-carrying units are of cast aluminium; into each is screwed a steel clamp-fitting which secures one end of the overhung rocker spindle, each spindle being a cantilever; the inlet-valve units communicate with the induction chamber formed in the rear portion of the crankcase. The push rods are located at the sides of the cylinders, one behind the other, the rods being operated by seven short fore-and-aft camshafts, each being fitted with a pinion which meshes with a common large-diameter driving gear, the latter being driven by the crankshaft at a low speed through an epicyclic gear. The rear ends of the separate camshafts are employed as auxiliary drives for the H.T. distributors, the two oil pumps, gun-gear, tachometer, and dynamotor. The supercharger is of the moderate-speed rotor type, in which the duralumin rotor is in the form of a thin disc carrying vanes which are tangential to a circle of comparatively small diameter. Dual ignition is provided by two battery and coil systems, the distributors having automatic advance. The two sparking plugs are located at opposite sides of the cylinder head. The altitude control of the single carburettor is also automatic in operation. Electric starting is provided for. Roller bearings are provided

throughout, including those of the master-rod big end and the auxiliary connecting rods and the rockers. Owing to the absence of plain bearings, a comparatively low oil-pressure system is employed.

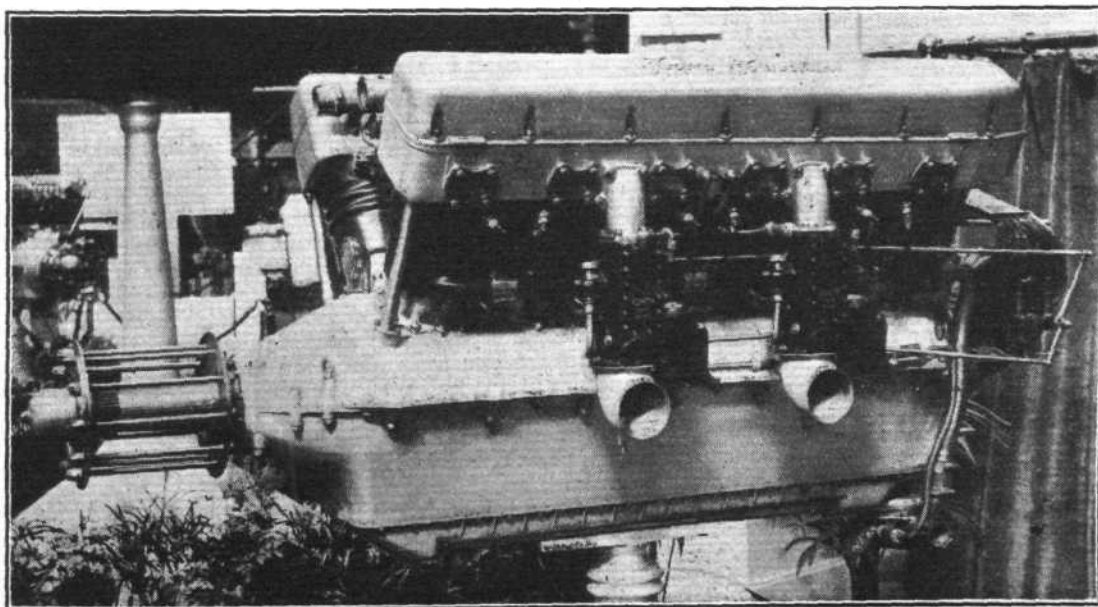
#### Isotta-Fraschini

Of the three engines shown by this firm, two are water-cooled, one being a 12-cylinder 60° V-type, and the other an 18-cylinder broad-arrow type, whilst the third engine is an air-cooled 12-cylinder of the 60° V-type. The two water-cooled engines, the Asso 500 and the Asso R.I.1000, are similar in general design, excepting that the larger has three banks of six cylinders, and is provided with a spur reduction gear. The two smaller engines are direct driven.

In both water-cooled engines the cylinders are of the separate unit type, the closed-ended forged steel barrels being provided with welded-on steel jackets; they are, however, secured by studs to a common monobloc head basting of Electron, in which the valve ports and head cooling water passages are cast integral. Two inlet and two exhaust valves are fitted in each head, each pair of valves being operated by one cam and one rocker, the latter being of T-shape having the extremities fitted with adjustable contact screws. Two camshafts are fitted in each head, one



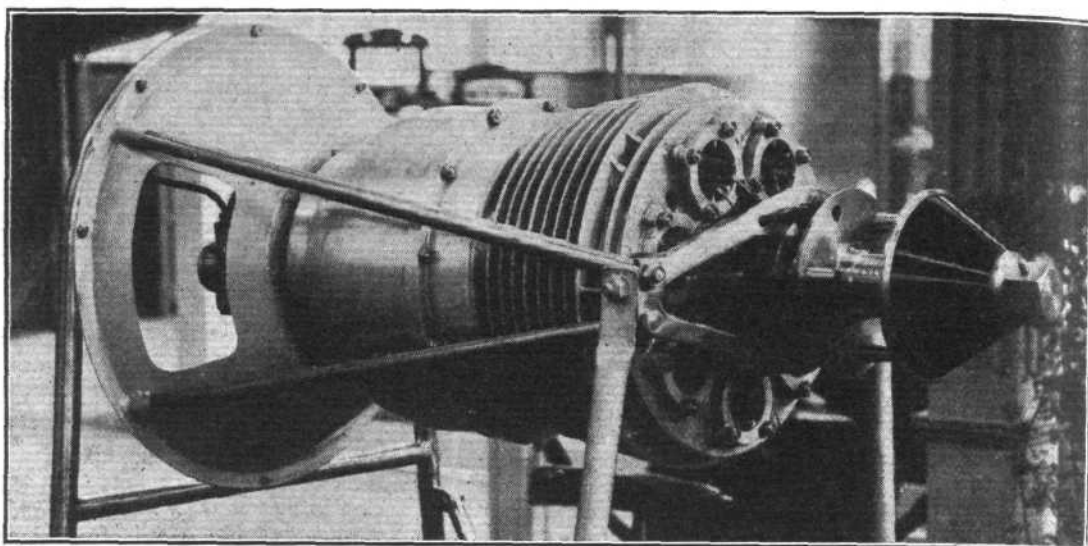
The Isotta Fraschini "Asso Caccia" is an air-cooled 12-cylinder, V-type engine with a normal output of 420 b.h.p.



The Isotta Fraschini "Asso 500," 60° V-type engine develops 518 b.h.p. at 1,850 r.p.m.,



The "Statax" engine has a normal output of 40 b.h.p. at 1,800 r.p.m. The engine is of the rotary type.



of these being bevel driven, whilst the other is driven through equal spur wheels from the driven shaft. Each pair of camshafts is carried in seven plain twin-bearings.

The crankcase is in three portions, one joint being on the centre line of the crankshaft, whilst the other allows the oil tray bottom of the crank chamber to be removed for the inspection of the bearings and crankshaft. The latter is carried in eight plain bearings, a double-thrust ball bearing of the washer type being fitted between the two journals at the forward end of the shaft. The big-end construction is of the master and auxiliary rod type, in all three engines, the master rod big ends having white-metal lined split bushes.

The auxiliary drives are arranged at the rear in the conventional manner, the two Marelli magnetos being mounted transversely. The water pump casing is bolted directly to the bottom of the rear end of the crankcase. Lubrication is provided by three gear-type pumps, one pressure and two scavenge. The cylinders are supplied by four Zenith carburettors (six in the larger engine) all located on the outer sides of the cylinder banks. Gas starter distributors are provided on both engines.

The Asso 500 has a bore and stroke of 140 mm. and 150 mm., respectively, the compression ratio being 5.7:1. The normal output is 518 b.h.p. at 1,850 r.p.m., whilst the maximum output is 543 b.h.p. at 2,060 r.p.m. The dry weight of this engine is 925 lbs.

The Asso R.I. 1,000 has a bore and stroke of 150 mm. and 180 mm., respectively, and has a normal output of 1,000 b.h.p. at 1,700 crankshaft r.p.m., the maximum output being 1,100 at 1,850 r.p.m., the airscrew being driven through a reduction gear, having a ratio of 0.666:1, or 0.582:1 if desired. The compression ratio is 5.3:1. The dry weight of this engine is 1,768 lbs. without the reduction gear.

The Asso Caccia, air-cooled 12-cylinder V-type engine, is of great interest, especially as there is only one other engine in the Show, the A.D.C. Airsix, which has more than four air-cooled cylinders in line. As in the case of the Airsix, a special form of cowling has been designed to ensure that an adequate cooling draught is directed around the cylinders.

This engine develops a normal output of 420 b.h.p. at 2,250 r.p.m., and 450 b.h.p. at the same speed on full load, the airscrew being directly driven. The bore and stroke are 125 mm. and 140 mm., respectively, the compression ratio being 5.4:1. The general arrangement of the engine, excluding the cylinders, is similar to that of the water-cooled types, the crankcase, the arrangement of the auxiliary drives and carburettors being the same. The cylinders are of steel throughout, having integral heads, but the latter are bolted to a common valve gear housing, in which the inlet and exhaust passages are cast integral. This housing totally encloses the valves, and is therefore bolted in direct contact with the heads and performs, in effect, the functions of the usually more extensive "poultice"-type of head. This form of construction provides an interesting contrast to that of the Airsix, in which the valve gear is mounted as high above the heads as possible, to provide ample space for the cooling draught over the tops of the combustion chambers. In the case of the Asso Caccia, a certain amount of cooling is presumably effected by the oil circulating in the valve casing. The actual arrangement of the valves and their operating gear

is the same as in the water-cooled types. The weight of this engine is 695 lbs.

## SWITZERLAND.

### Statax

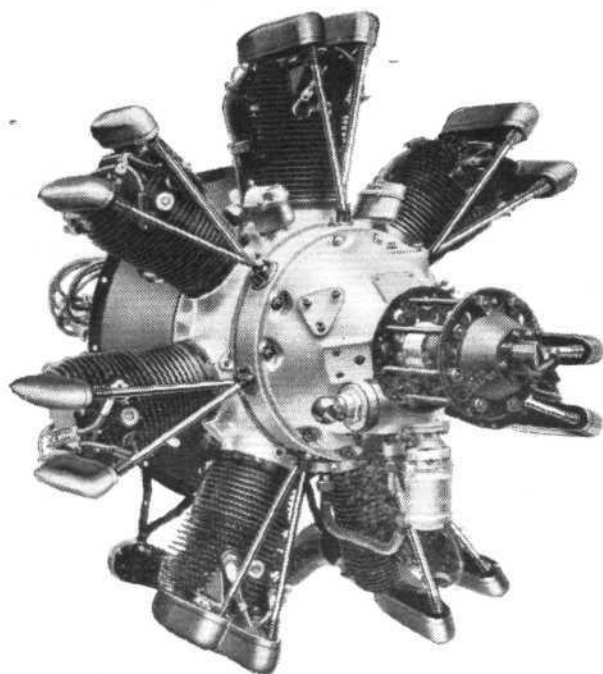
AN interesting little air-cooled rotary engine of the axial type, sometimes called the "drum" type, is being shown by the Statax Motor, A.-G., of Zurich. Those whose association with or interest in aero engines dates back to pre-War days may remember that this is not the first appearance at Olympia of this engine, as it was exhibited at the last Aero Show before the War. The engine now being shown at Olympia has a normal output of 40 b.h.p. at 1,800 r.p.m., the maximum b.h.p. being 42 at 1,900 r.p.m. It differs in many respects from the earlier model although the underlying principle remains the same, *i.e.*, a horizontal reciprocating motion is imparted to the pistons, as the cylinder group rotates, by an inclined rotating annular member to which the pistons are coupled by ball-ended connecting rods. The makers term this member the "stroke-ring," as its inclination to the axes of the cylinders and also its diameter will determine the length of stroke. It will be seen that the "stroke ring" (why do the makers not use the term swash-plate?) replaces the Z crankshaft or "wobble" gear, which is employed in some other engines of the axial type. It should be noted that the stroke ring has not any wobbling motion but rotates steadily in the same inclined plane. The cylinder group is formed by a single aluminium alloy casting, the seven cylinders having a bore and stroke of 62 mm. and 110 mm. respectively, the compression ratio being 5.3:1. The heads of the cylinders are closed by bolted-on caps. The cylinders are provided with steel liners, which also form single sleeve valves. The inlet and exhaust ports are located opposite each other and are formed by slots in the cylinder casting, the exhaust ports, of course, being on the outer side. The "mono-sleeves," as they are called, are reciprocated by a grooved cam drum. The exhaust valve ports also admit a portion of the air during the suction stroke and are considerably cooled thereby.

It is unfortunate that the engine shown at Olympia has not a portion of the crankcase cut away to show the arrangement of the stroke ring and the grooved drum operating the sleeve valves. Incidentally it would appear to be a little optimistic to expect the cylinder liners to be effectively cooled, owing to the film of oil located between them and the radiating surface, or, on the other hand, for the film of oil to remain intact and provide efficient lubrication for the sleeve under the operating conditions. We understand, however, that in practice the engine functions satisfactorily and that it has been tested in flight.

The mixture is supplied by a specially designed Statax carburettor, whilst dual ignition is provided by two Bosch magnetos fitted at the rear of the engine, these supplying the plugs through a rotating distributor. Forced feed lubrication is provided by an adjustable piston pump, also located at the rear of the engine. The overall diameter of the engine is 17.35 ins. and the weight is 110 lbs.

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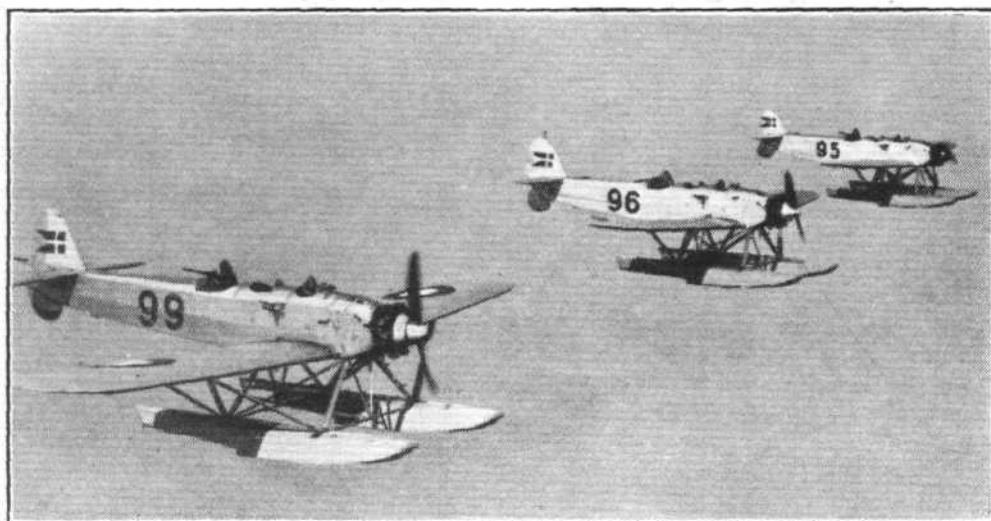
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## MOTEURS ARMSTRONG SIDDELEY



### GRAND RAID AÉRIEN DES MOTEURS "JAGUAR" À RÉDUCTEUR

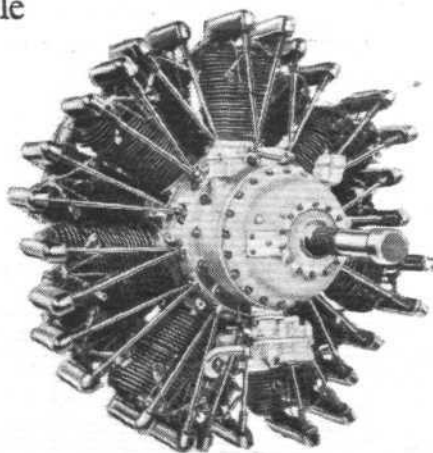
**T**OUTE une escadrille d'hydravions Heinkel, munis de moteurs "Jaguar" de 460-500 c.v. à réducteur, s'est rendue récemment par air du Danemark à Barcelone, pour accomplir ensuite le voyage de retour par la même voie. A la fin de ce grand raid aérien, il fut déclaré que les moteurs avaient "fonctionné avec une régularité d'horloge pendant toute la durée du trajet."

Les moteurs "Jaguar" sont en service sur les lignes aériennes les plus nouvellement établies par l'Imperial Airways. Si l'on désire obtenir la plus grande douceur de fonctionnement ainsi que la meilleure performance réalisables, il convient de spécifier le

"JAGUAR"

à  
réducteur

14 CYLINDRES  
460-500 C.V.



SALON  
AÉRONAUTIQUE  
**OLYMPIA**  
16-27 JUILLET  
STAND

**86**

ARMSTRONG SIDDELEY MOTORS LIMITED  
Siège Social et Usines : Coventry.      Londres : 10 Old Bond Street, W.1





# AVIONS ARMSTRONG WHITWORTH



3 ANNÉES. 7,000 HEURES. 1,013,865 KILOMETRES

**I**LS sont les chiffres que comptent à leur actif les avions "ARGOSY" Armstrong Whitworth utilisés sur la route aérienne Londres-Paris.

Au cours de cette période, les avions "Argosy" Armstrong Whitworth—munis de trois moteurs "Jaguar"—ont dépassé tout ce que l'on attendait d'eux, au triple point de vue de régularité, endurance générale et faible dépense d'entretien; de plus, ILS SONT TOUJOURS EN PARFAIT ÉTAT. Pour s'assurer une navigation aérienne d'un caractère sûr et profitable, il convient de spécifier l'appareil "ARGOSY." Correspondance invitée.

## PRINCIPALES CARACTÉRISTIQUES

Vitesse de croisière	95 mill/h.	152 km/h.
Vitesse maximum	120 mill/h.	192 km/h.
Endurance aérienne	3 heures $\frac{1}{2}$	
Charge utile	5,000 lbs.	2,273 kgs.
Essence	250 gallons	1136 litres.
Huile	21 gallons	95 litres

SALON AÉRONAUTIQUE

STAND

OLYMPIA

87

16—27 JUILLET

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LIMITED

Usines et Aérodrome: Whitley, Coventry

Londres: 10 Old Bond Street, W.1

# AVIONS ARMSTRONG WHITWORTH



## AVIONS "ATLAS" ENTIÈREMENT EN ACIER (SUR ROUES, FLOTTEURS OU SKIS)



L'AVION "ATLAS" entièrement en acier est le meilleur qui existe pour opérations de reconnaissance sur terre ou sur mer. Il constitue le biplace normal de coopération militaire actuellement en usage dans l'Aviation Royale de la Grande Bretagne. C'est précisément cette construction entièrement en acier qui explique la durabilité et la facilité d'entretien vraiment incomparables. Muni du moteur "Jaguar" Armstrong Siddeley (à prise directe ou à réducteur) renommé dans le monde entier, cet avion, par sa vitesse, la rapidité de sa montée et son plafond, répond aux exigences de service les plus sévères.

Il se construit en grand dans les usines d'appareils d'aviation les mieux outillées de l'Europe.

### PERFORMANCE—DONNEES NUMERIQUES

#### AVION "ATLAS" MUNI DU MOTEUR "JAGUAR" AVEC COLLIER TOWNEND

Combustible: 75 gallons (337 litres).

Huile: 7 gallons (32 litres).

Charge militaire: 880 lbs. (400 kgs).

	Moteur prise directe:	Moteur à réducteur		Moteur prise directe	Moteur à réducteur
Poids total approximatif	4000 lbs. 1820 kgs.	4115 lbs. 1870 kgs.	Temps de montée à	5 min. $\frac{1}{4}$	4 min. $\frac{1}{4}$
			" " " "	12 " $\frac{1}{2}$	10 " $\frac{1}{2}$
Vitesse au niveau du sol	143,5 mill/h.	149 mill/h.	" " " "	26 " $\frac{1}{2}$	21 " $\frac{1}{2}$
	231 km/h.	240 km/h.	" " " "	3 " $\frac{1}{2}$	2 " $\frac{1}{2}$
" 5000 pieds	139,5 mill/h.	145 mill/h.	" " " "	12 " $\frac{1}{2}$	10 " $\frac{1}{2}$
" " 10000 pieds	134 mill/h.	140 mill/h.	" " " "	34 " $\frac{1}{2}$	27 " $\frac{1}{2}$
" " 15000 pieds	125 mill/h.	131 mill/h.	Plafond absolu	19000 pieds	19100 pieds
" " 1000 mètres	226 km/h.	236 km/h.		5800 mètres	5830 mètres
" " 3000 mètres	216 km/h.	225 km/h.	Plafond pratique	17300 pieds	17700 pieds
" " 5000 mètres	193 km/h.	204 km/h.		5280 mètres	5400 mètres
			Nombre de t/min. :	Maximum admissible:	2200
				Normal:	2000

SALON AÉRONAUTIQUE, OLYMPIA. 16-27 JUILLET. STAND 87

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LIMITED

Usines et Aérodrome : Whitley, Coventry.

Londres : 10 Old Bond Street, W.1

Maker.	Designation and Rated Power.	Number of Cylinders and Cooling. A = Air. W = Water.	Cylinder Arrangement.	Bore.		Stroke.	Total swept Volume. cu. ins. litres.	Reduction Gear.		Compression Ratio.	Normal Output and Speed. B.H.P. R.P.M.	Maximum Output and Speed. B.H.P. R.P.M.	Normal Output per litre Capacity.	Dry Weight. lb. kg.	Carburetors.	Magneto or Other Ignition.	Remarks.
				ins. mm.	ins. mm.			Ratio.	Type.								
A.B.C.	Scorpion, Mk. II, 34 h.p.	2A	Horizontal Opposed.	4.01	3.6	91.5	1	—	6	35	40	23.3	109	Zenith	B.T.H.	—	
"	Hornet, 75 h.p.	4A	"	4.01	4.8	243	1	—	5.5	2,300	2,750	49.5	225	"	Watford	—	
A.D.C.	Nimbus, 300 h.p.	6W	In line	6.0	7.5	1,270	1	—	5.4	1,875	2,175	14.7	670	Zenith	Siemens	—	
"	Airsix, 275 h.p.	6A	"	5.4	7.5	1,030	1	—	5	305	332	16.2	304	Zenith	"	—	
Armstrong-Siddeley	Geared Leopard, 800 h.p.	14A	Radial	137	190	16.9	0.633	Spur	5	275	300	16.8	620	65G	"	—	
"	Geared Jaguar, 460 h.p.	14A	"	152	190	48.65	0.657	Epicyclic	5	1,750	1,950	16.8	282	Claudel-Hobson	B.T.H.	—	
"	Lynx, 215 h.p.	7A	"	127	140	24.8	1	—	5	815	860	16.8	748	Armstrong-Siddeley	B.T.H.	—	
"	Mongoose, 150 h.p.	5A	"	127	140	24.8	1	—	5	480	510	403.6	890	Zenith	B.T.H.	—	
"	Genet Major, 100 h.p.	5A	"	5.0	5.5	757	1	—	5	2,000	2,200	17.6	505	65G	Watford	—	
"	Genet, 80 h.p.	5A	"	127	140	8.86	1	—	5	155	165	17.5	365	Zenith	B.T.H.	—	
Bristol	Jupiter VI F.H., 420 h.p.	9A	Radial	4.25	4.5	319	1	—	5.2	1,850	2,035	19.7	250	65G	"	—	
"	Jupiter VI F.M., 465 h.p.	9A	"	108	114	5.23	1	—	5.25	103	110	19.9	210	Claudel-Hobson	B.T.H.	—	
"	Jupiter VI F.L., 445 h.p.	9A	"	102	102	4.12	1	—	5.8	82	88	14.6	750	Claudel-Hobson	B.T.H.	—	
"	Jupiter VII F., 500 h.p.	9A	"	146	190	28.7	1	—	5.3	2,200	2,420	14.6	95.4	Bristol Triplex	B.T.H.	Maintains normal output to 4,000 ft.	
"	Jupiter VIII F., 460 h.p.	9A	"	5.75	7.5	1,750	1	—	5.3	420	450	16.1	342	"	"	—	
"	Jupiter IX F., 515 h.p.	9A	"	146	190	28.7	1	—	5.0	1,700	1,870	15.5	750	"	"	—	
"	Jupiter XI F., 590 h.p.	9A	"	5.75	7.5	1,750	1	—	5.3	445	480	16.7	790	"	"	—	
"	Neptune I, 290 h.p.	7A	"	5.75	7.5	1,750	0.5	Beve	5.8	1,700	1,870	16.0	900	"	"	Gear-driven supercharger, 480 b.h.p. at 9,000 ft.	
"	Titan II, 205 h.p.	5A	"	5.75	7.5	1,750	0.5	Epicyclic	5.3	1,775	1,950	17.9	900	"	"	Maintains normal output to 4,000 ft.	
Cirrus	Mk. III, 85 h.p.	4A	In line	4.6	190	28.7	0.5	"	5.0	460	480	17.1	409	"	"	—	
"	Hermes, 100 h.p.	4A	"	5.75	6.5	1,180	0.5	"	5.0	515	545	17.1	409	"	"	—	
De Havilland	Gipsy, 85 h.p.	4A	"	146	165	19.3	1.0	—	5.0	2,000	2,200	15.0	610	Bristol Duplex	"	—	
Napier	Lion V, 450 h.p.	12W	Broad-Arrow	146	165	13.8	1.0	—	5.0	290	315	15.0	278	"	"	—	
"	Lion VII B, 800 h.p.	12W	"	5.75	6.5	845	1.0	—	5.0	1,700	1,870	14.9	500	"	"	—	
"	Lion XI, 530 h.p.	12W	"	146	165	13.8	1.0	—	5.0	1,700	1,870	14.9	500	"	"	—	
Pobjoy	Type PI, 60 h.p.	7A	Radial	4.34	5.12	301	1.0	—	5.1	90	94	18.2	285	Claudel-Hobson	B.T.H.	—	
Redrup	Redrup, 85 h.p.	7A	Axial	110	130	4.94	1.0	—	5.1	1,900	2,100	18.4	310	"	Watford	—	
Rolls-Royce	F.XI A, 490 h.p.	12W	60° Vee	4.5	5.05	318	1.0	—	5.0	105	115	17.2	285	Zenith	B.T.H.	—	
"	F.XI B, 480 h.p.	12W	"	114	128	5.23	0.66	Spur	5.8	1,900	2,100	17.2	285	48 R.B.	B.T.H.	—	
"	F.XII A 490 h.p.	12W	"	5.12	5.5	1,360	0.767	Counter-shaft	10.0	450	502	20.2	950	Claudel-Hobson	B.T.H.	—	
"	F.XII B 480 h.p.	12W	"	130	140	22.3	0.532	Spur	6.0	2,000	2,200	36.4	432	"	Watford	Schneider Trophy Winner	
"	F.XI S 480 h.p.	12W	"	5.12	5.5	1,360	0.532	Spur	6.0	812	875	36.4	995	"	"	—	
"	F.XI M.S. 525 h.p.	12W	"	130	140	22.3	0.525	Helical	5.7	3,000	3,300	23.7	452	"	B.T.H.	—	
"	H.X. M.S., 825 h.p.	12W	"	2.83	3.42	150	1.0	—	5.0	530	570	24.4	930	Zenith	B.T.H.	—	
Sunbeam	Sikh III, 1,000 h.p.	12W	"	72	87	2.46	1.0	—	5.0	60	67.5	24.4	115	36 A.K.B.	B.T.H.	—	
"	P.I. Compression-Ignition, 100 h.p.	6W	In line	3.42	4.69	304	1.0	—	5.0	3,000	3,300	24.4	422	Claudel-Hobson	B.T.H.	—	
"	"	6W	"	87	119	4.98	0.632	Spur	6.0	85	100	17.0	175	80.5	"	—	
"	"	6W	"	5.0	5.5	1,295	0.632	"	6.0	2,000	2,200	20.3	865	Rolls-Royce Duplex	B.T.H.	—	
"	"	6W	"	127	140	21.2	0.632	"	7.0	430	530	20.3	865	"	"	—	
"	"	6W	"	5.0	5.5	1,295	0.552	"	6.0	2,250	2,475	20.3	865	"	"	—	
"	"	6W	"	127	140	21.2	0.552	"	7.0	430	530	20.3	865	"	"	—	
"	"	6W	"	5.0	5.5	1,295	0.632	"	6.0	2,250	2,475	20.3	865	"	"	—	
"	"	6W	"	127	140	21.2	0.552	"	7.0	480	570	22.6	865	"	"	—	
"	"	6W	"	5.0	5.5	1,295	0.552	"	6.0	2,250	2,475	22.6	865	"	"	—	
"	"	6W	"	127	140	21.2	0.552	"	6.0	490	540	23.1	900	Rolls-Royce	"	480 h.p. at 11,500 ft.	
"	"	6W	"	5.0	5.5	1,295	0.552	"	5.5	2,250	2,475	24.8	409	"	"	Output as given, at 3,000 ft.	
"	"	6W	"	127	140	21.2	0.477	"	5.25	5.2	630	24.8	900	"	"	—	
"	"	6W	"	6.0	6.6	2,030	0.477	"	5.25	825	900	24.8	1,460	"	"	—	
"	"	6W	"	152	167	33.3	0.57	"	5.0	2,000	2,200	14.8	665	"	"	—	
"	"	6W	"	7.3	8.3	4,120	0.57	"	5.0	1,000	1,025	14.8	2,760	Zenith	B.T.H.	Airship engine.	
"	"	6W	"	185	210	67.74	1.0	—	12.0	1,650	1,760	11.7	1,252	"	"	—	
"	"	6W	"	4.73	5.12	537	1.0	—	12.0	104	112	11.7	435	None	None	—	
"	"	6W	"	120	130	8.82	1.0	—	12.0	1,500	1,600	11.7	198	"	"	—	



# DATA OF FOREIGN ENGINES AT OLYMPIA

FLIGHT, JULY 25, 1929

Country of Origin.	Designation and Rated Power.	Number of Cylinders and Cooling.	Cylinder Arrangement.	Bore.	Stroke.	Total swept Volume.	Reduction Gear.		Compression Ratio.	Normal Output and Speed.	Maximum Output and Speed.	Normal Output Per litre Capacity.	Dry Weight.	Carburetors.	Magneto or Other Ignition.	Remarks.
				ins. mm.	ins. mm.		Ratio.	Type.								
		A = Air. W = Water.				cu. ins. litres				B.H.P. R.P.M.	B.H.P. R.P.M.		lb. kg.			
<b>Czechoslovakia</b>																
Walter	Vega I, 85 h.p.	5A	Radial	4-12 105	4-72 120	317 5-15	1-0	—	5-15	85 1,750	90 1,800	16-5	226 103	Zenith	Scintilla	—
"	Venus I, 100 h.p.	7A	"	4-12 105	4-72 120	444 7-3	1-0	—	5-15	110 1,750	115 1,800	15-1	293 133	"	"	—
"	Mars I, 140 h.p.	9A	"	4-12 105	4-72 120	571 9-4	1-0	—	5-15	145 1,750	150 1,800	15-4	350 159	"	"	—
"	Castor, 240 h.p.	7A	"	5-31 135	6-96 170	1,040 17-0	1-0	—	6-0	240 1,750	260 1,850	14-1	550 250	"	"	Full throttle power = 340 b.h.p. at ground level.
<b>France</b>																
Hispano-Suiza	Type 6 Pa, 100 h.p.	6W	In line	4-34 110	5-52 140	480 7-9	1-0	—	5-5	100 2,000	145 500	12-7	374 170	Hispano-Solex	R.B.	—
"	12 Hbr., 500 h.p.	12W	60° Vee	5-52 140	5-91 150	1,685 27-7	0-5	Bevel epicyclic	6-2	2,000	580	19-1	1,030 470	"	"	—
"	12 Nb., 650 h.p.	12W	"	5-91 150	6-7 170	2,190 36-0	1-0	—	6-2	650 2,000	750	18-0	1,030 470	"	"	—
Farman	18 WI, 600 h.p.	18W	Inverted broad arrow	4-34 110	4-92 125	1,303 21-4	0-407	Bevel epicyclic	5-7	600 2,800	730 3,400	28-0	930 423	Zenith	Battery and coil	Supercharged. Weight includes electric starter.
"	9 Ea, 250 h.p.	9A	Radial	4-53 115	4-72 120	685 11-2	0-5	"		250 2,500	280 2,700	22-3	536 244	"	"	Weight includes dynamo and electric starter.
Lorraine	5 Pb, 110 h.p.	5A	Radial	4-92 125	5-5 140	487 8-16	1-0	—	5-0	110 1,650		13-5	332 151	"	Ducillier	—
"	7 Mb, 230 h.p.	7A	"	5-32 135	5-91 150	915 5-1	1-0	—	5-0	240 1,800		16-0	615 280	"	"	—
"	12 Ed, 450 h.p.	12W	Broad arrow	4-73 120	7-1 180	1,485 24-4	0-647	Spur epicyclic	6-0	450 1,900		18-5	910 413	"	"	—
"	48 S, 600 h.p.	12W	"	5-71 145	6-3 160	1,930 31-7	0-647	"	5-0	600 2,000	712 2,150	18-9	1,020 465	"	"	—
"	18 Kd, 650 h.p.	18W	"	4-73 120	7-1 180	2,230 36-7	0-647	"	6-0	650 2,000		17-7	1,320 600	"	"	—
Renault	Type 12 Kh, 570 h.p.	12W	60° Vee	5-28 134	7-1 180	1,855 30-5	0-568	Spur	5-6	570 1,900	633 2,100	18-7	1,165 530	"	S.E.V.	—
"	12 Kg, 550 h.p.	12W	"	5-28 134	7-1 180	1,855 30-5	1-0	—	5-6	550 1,800	610 2,000	18-0	1,040 475	"	"	—
"	12 Jo, 500 h.p.	12W	"	4-92 125	6-7 170	1,525 25-0	0-5 or 0-66	Spur	5-6	500 2,020	542 2,240	20-0	890 405	"	"	—
"	12 Ja, 450 h.p.	12W	"	4-92 125	6-7 170	1,525 25-0	1-0	—	5-6	450 1,800	510 2,000	18-0	815 370	"	"	—
"	250 h.p.	9A	Radial	4-92 125	5-91 150	1,010 16-5	1-0	—		250 1,700	270	15-1	550 270	"	"	—
"	80 h.p.	4A	In line	4-53 115	5-52 140	354 5-82	1-0	—		70 1,700	80 1,800	12-0	319 145	"	Ducillier	—
Salmson	Type 18 AB, 500 h.p.	18A	Duplex radial	4-92 125	7-1 180	2,420 39-8	1-0	—	5-2	500 1,700	550 1,750	12-5	990 450	Claudel	Salmson	—
"	9 AB, 230 h.p.	9A	Radial	4-92 125	6-7 170	1,140 18-7	1-0	—	5-0	230 1,700		12-3	585 265	"	"	—
"	9 AC, 120 h.p.	9A	"	3-94 100	5-12 130	560 9-2	1-0	—	5-0	120 1,800		13-1	373 170	"	"	—
"	9 AD, 40 h.p.	9A	"	2-75 70	3-38 86	222 3-65	1-0	—	5-6	40 2,000		11-0	154 70	Zenith	"	—
"	7 AC, 95 h.p.	7A	"	3-94 100	5-12 130	435 7-15	1-0	—	5-0	95 1,800		13-3	286 130	"	"	—
"	5 AC, 60 h.p.	5A	"	3-94 100	5-12 130	310 5-1	1-0	—	5-0	60 1,800		11-8	242 110	"	"	—
<b>Italy</b>																
Colombo	Type S 53, 85 h.p.	4A	In line	4-5 114	5-52 140	348 5-71	1-0	—	5-0	87 1,700	94 1,900	15-2	228 103	Zenith	Marelli	—
Fiat	A 25, 950 h.p.	12W	60° Vee	6-7 170	7-98 200	3,321 54-5	1-0	—	5-25	950 1,700	1,000 1,900	17-5	1,854 845	Fiat	"	—
"	A 22, 550 h.p.	12W	"	5-32 135	6-3 160	1,702 27-9	1-0	—	5-5	570 1,900	620 2,100	20-4	1,004 471	"	"	World long-distance record holder.
"	A 50, 80 h.p.	7A	Radial	3-94 100	4-73 120	402 6-59	1-0	—	5-0	85 1,600	95 1,800	12-9	275 125	Zenith	"	—
Fuscaldo	90 h.p.	7A	"	3-54 90	4-73 120	325 5-34	1-0	—		90 2,500	105 2,500	16-8	297 135	"	Battery and coil	Variable-pitch airscrew provided; supercharged.
Isotta-Fraschini	Asso R.I., 1,000 h.p.	18W	Broad arrow	5-9 140	7-1 150	3,480 57-2	0-66	Spur	5-3	1,000 1,700	1,100 1,850	17-5	1,768 805	Zenith	Marelli	Weight given does not include reduction gear.
"	500 h.p.	12W	60° Vee	5-52 140	5-9 150	1,685 27-7	1-0	—	5-7	518 1,850	543 2,060	18-7	925 420	"	"	—
"	Asso Caccia, 400 h.p.	12A	"	4-92 125	5-52 140	1,265 20-6	1-0	—	5-4	420 2,250	450 2,250	20-4	695 315	"	"	—
<b>Germany</b>																
Argus	Type AS8, 80 h.p.	4A	In line, inverted	4-73 120	5-52 140	385 6-33	1-0	—	5-3	75 1,350	80 1,400	11-8	247 112	Sum	Scintilla	—
Méroudes-Benz	" F2, 800 h.p.	12W	60° Vee	6-5 125	8-3 125	3,285 52-2	0-51	Spur		800 2,200	1,000	14-8	1,800	Méroudes-Benz	Bosch and	Air fed to carburettor by

# TWO GREAT TRIUMPHS ON

# Pratts

## KING'S CUP

## AND SIDDELEY TROPHY WON ON PRATTS SPIRIT

"I had just that extra speed to pull it off!" said Flying Officer R. L. Atcherly, who made a new record for the King's Cup of 150.3 m.p.h. The second place and the Siddeley Trophy were also won on Pratts—by Lieut. L. G. Richardson, R.N.



## SOUTHERN CROSS FLIGHT ON SPIRIT AND OIL SUPPLIED BY PRATTS

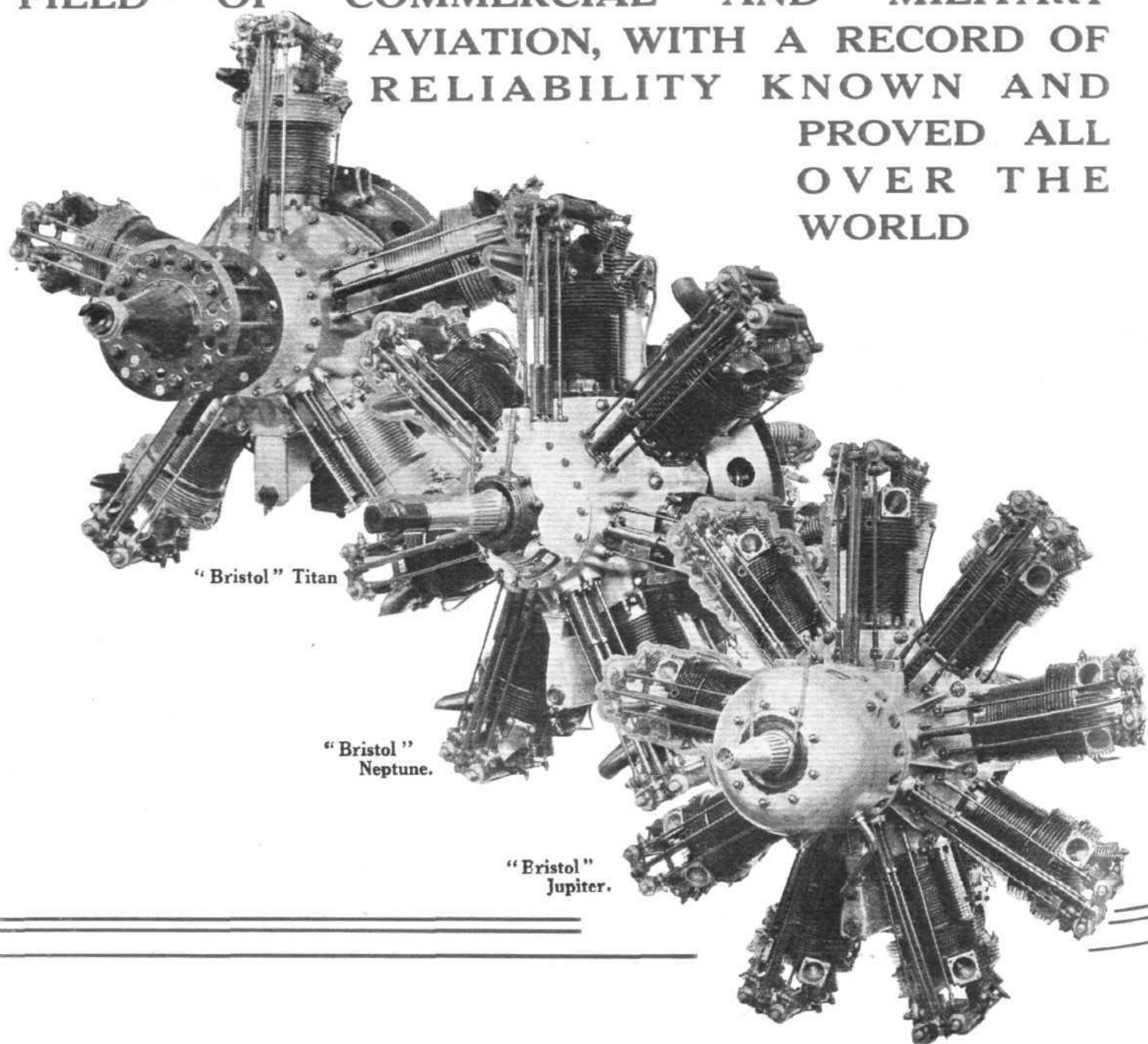
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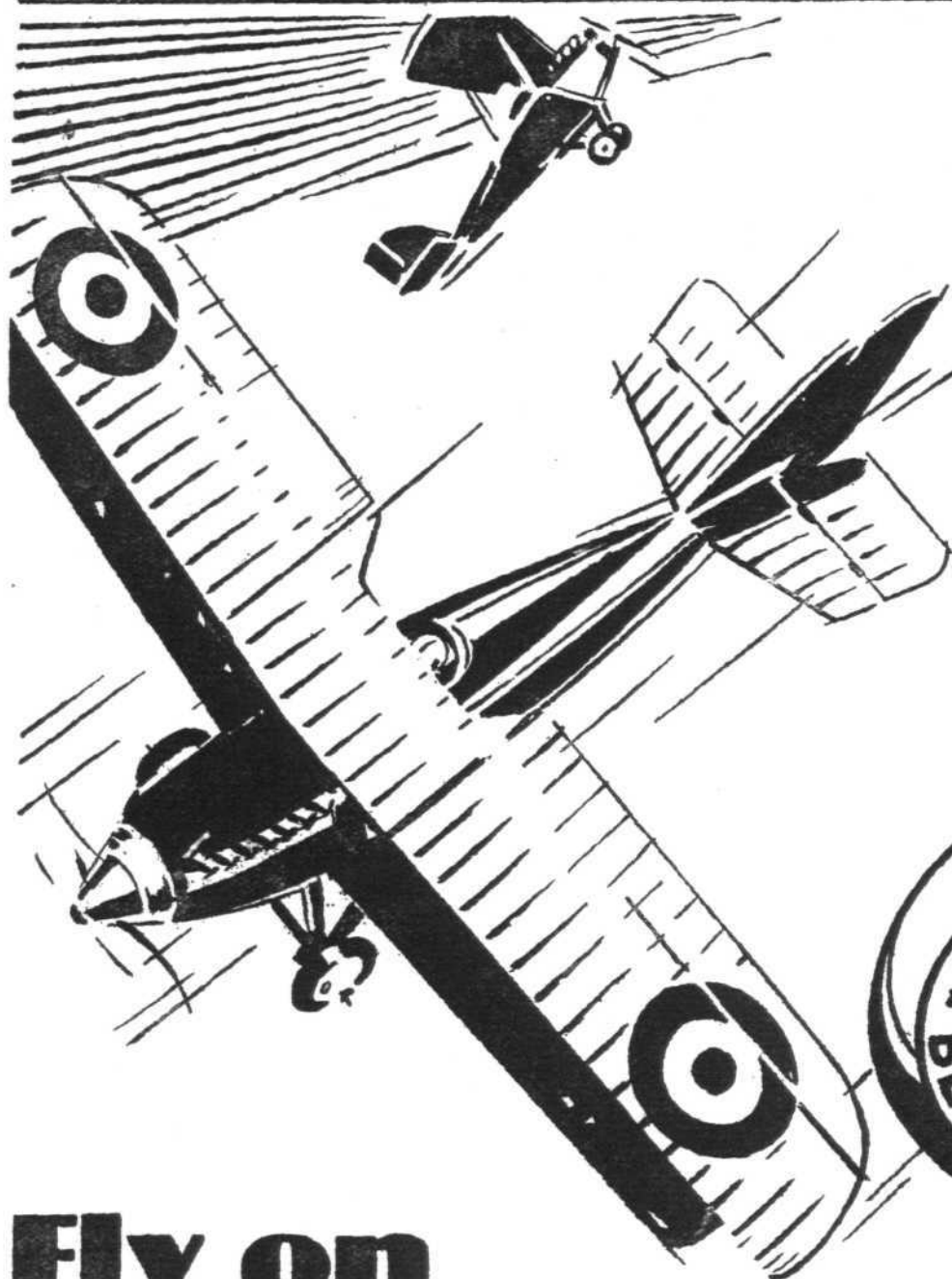
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# The AIRCRAFT ENGINEER

FLIGHT  
ENGINEERING  
SECTION

Edited by C. M. POULSEN

July 25, 1929

## CONTENTS

	PAGE
The Tail Plane Area to Give Longitudinal Stability. By W. R. Andrews, Higher National Diploma (Hons.)	53
In the Drawing Office	56

## EDITORIAL VIEWS.

This month's issue of THE AIRCRAFT ENGINEER is, we regret, a very small affair. This is due to the fact that the pages of FLIGHT this week are rather numerous owing to the Olympia Aero Show. We believe that, in this hot weather, and with so many other aviation events to occupy the interest, the disappointment of readers will be tempered with an understanding of the difficulties which beset an Editor who is faced with the problem of getting into his paper all the material which calls for comment or description, and yet keep that paper within reasonable bounds in the matter of size. Unfortunately, the cost of putting on extra pages is very great, and in view of the fact that FLIGHT of July 11 contained considerably more than 100 pages of editorial matter, while the July 18 issue was not very far short of that number, and the present issue is one of 74 pages, we hope our readers will appreciate the reasons for the curtailing of THE AIRCRAFT ENGINEER pages this month.

In our August 29 issue we hope to publish some very interesting articles by various well-known writers. Among them will be, we hope, Mr. Pollard, who has promised to review in that number the status of all-metal construction as exposed at the Olympia Aero Show. Prof. Everling, whose "High-speed," "Distance," and "Altitude" figures we now frequently use in aircraft descriptions, has done further work on the subject, and has added some new "figures" to those hitherto used in comparing the efficiency of aircraft of widely differing characteristics. It is hoped to have a translation of Dr. Everling's article ready for the August number of THE AIRCRAFT ENGINEER.

In the present issue Mr. Andrews, of the Avro Technical Staff, concludes his article on the "Tail Plane Area to Give Longitudinal Stability," while Mr. James, of the Gloster Technical Staff, contributes a short article which outlines a simple method of constructing and dimensioning elliptic fuselage sections.

Finally the Editor would remind readers that contributions to THE AIRCRAFT ENGINEER are always welcomed, and will be paid for at our usual rates. There is no restrictions on subjects, provided they deal with aircraft engineering in some form or other.

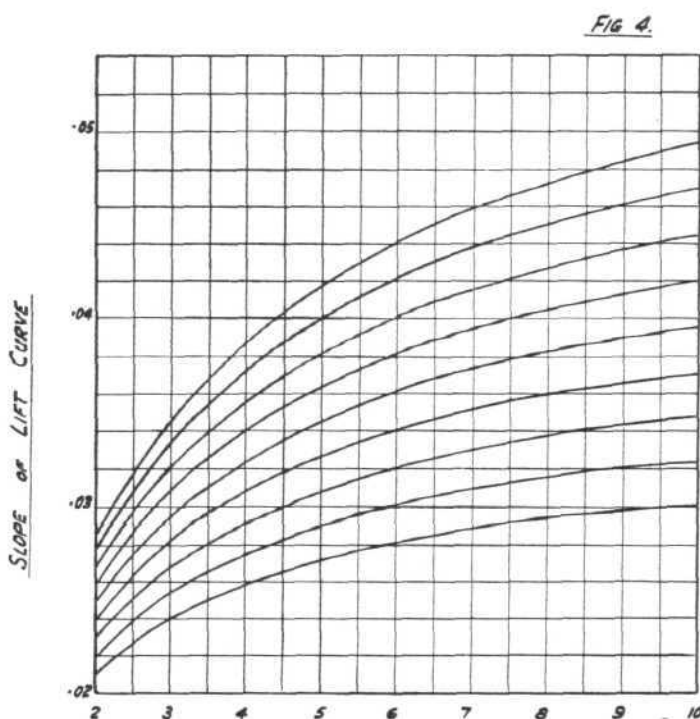
## THE TAIL PLANE AREA TO GIVE LONGITUDINAL STABILITY.

By W. R. ANDREWS, Higher National Diploma (Hons.).

(Concluded from page 52.)

Fig. 4 gives the slope of the lift curves for any aspect ratio based on equation 11. For example, if the slope of the curve is 0.03 at an aspect ratio 6, then the slope will be 0.0228 at an aspect ratio of 2, obtained by following the line passing through 0.03 at aspect 6 until aspect 2 is reached and then reading off the appropriate slope.

SLOPE OF LIFT CURVES



$$\text{EFFECTIVE ASPECT RATIO} = \frac{4A^2 \Delta u^2}{5u}$$



# THE AIRCRAFT ENGINEER

The above curves should only be used for monoplanes or monoplane tail units; for a biplane, the correction for aspect ratio must be modified for the proximity of the other wing.

Munk gives an arrangement whereby a biplane can be replaced by a monoplane of different aspect ratio, so that the drag of the two systems at the same lift is identical. The aspect ratio of the equivalent monoplane is given by:—

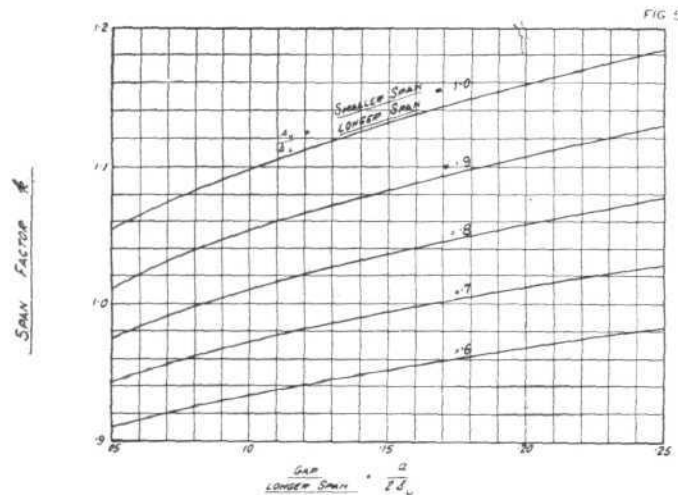
$$A_m = \frac{(2k s_u)^2}{S_w}$$

where

$s_u$  = semi-span of larger plane

$S_w$  = total wing area.

SPAN FACTORS FOR BIPLANES WITH EQUAL CHORDS



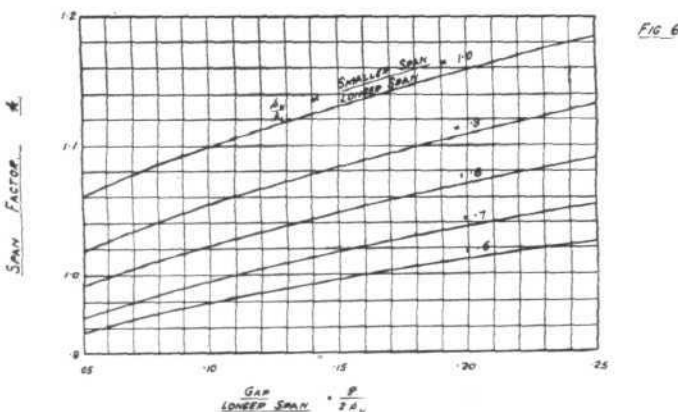
Figs. 5 and 6 give values of  $k$  for biplanes of equal chords and of equal aspect ratio respectively, and are reproduced from N.A.C.A. Report No. 293.

As it has been previously stated, the equivalent monoplane obtained as above is for drag only. To obtain the slope of the lift curve, the slope of the lift curve ( $a_m$ ) for the equivalent monoplane (for drag) is obtained from Fig. 4 and then subjected to the following correction:—

$$\frac{1}{a_w} = \frac{1}{a_m} + 2.28 \left( \frac{c}{h} \right)^2 \gamma \dots\dots\dots 1$$

where  $h$  = distance between the points e.c. of upper and lower wings.

SPAN FACTORS FOR BIPLANES WITH EQUAL ASPECT RATIOS

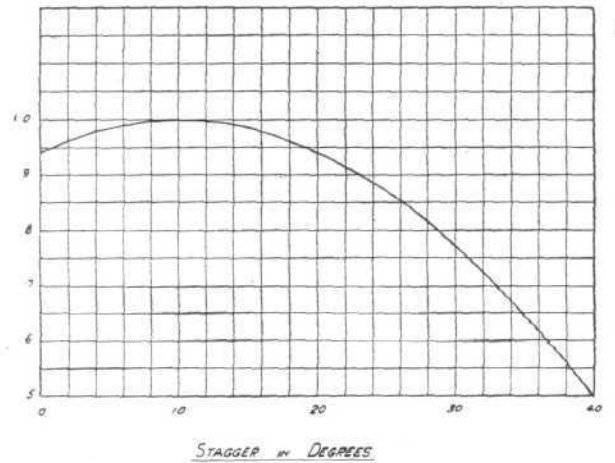


$\gamma$  is a function of incidence and stagger, but as its influence is small, it is sufficiently accurate to take its value at the mean range of incidence; it can then be obtained directly from Fig. 7, where  $\gamma$  is plotted against the stagger in degrees.

Where the chord of the lower wing varies from that of the top wing the stagger can be taken as being that of the points e.c. of upper and lower wings.

The downwash angle is dependent upon the aspect ratio

STAGGER CORRECTION TO LIFT



of the main plane and the position of the tail plane with respect to the wing-tip vortices.

The distance between the wing-tip vortices ( $2s_1$ ) is given by Fig. 8, which is a nomogram giving  $s_1/s$  in terms of the wing aspect ratio and the slope of the lift curve for an aspect ratio of 6, " $s$ " being the semi-span of the wing.

The slope of the lift curve for the monoplane model of aspect ratio 6 should not be used in the case of a biplane, but the slope obtained as follows:

First obtain the slope of the biplane system as a whole by means of Figs. 4 and 5 or 6 and equation 13.

If the ratio of the lift coefficients of upper and lower wings is known, the slope of the lift curve for each wing can then be obtained.

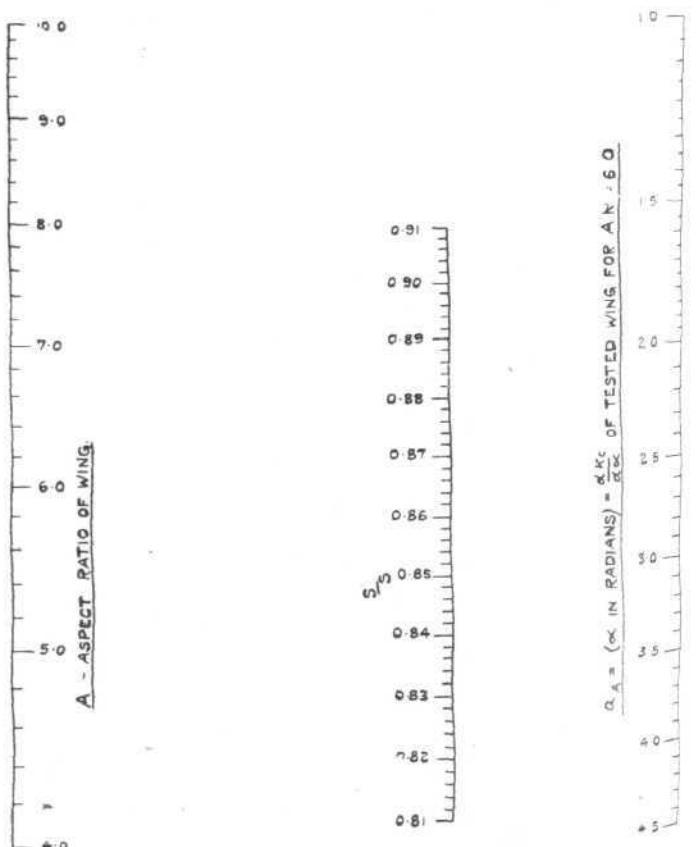
$$\text{Let } a_1 = x a_2 \dots\dots\dots 14$$

$$\text{then } a_w = \frac{x a_2 S_u + a_2 S_L}{S_u + S_L} \dots\dots\dots 15$$

DOWNWASH ANGLES

NOMOGRAM FOR VALUES OF  $k_{w/6}$

FIG. 8.



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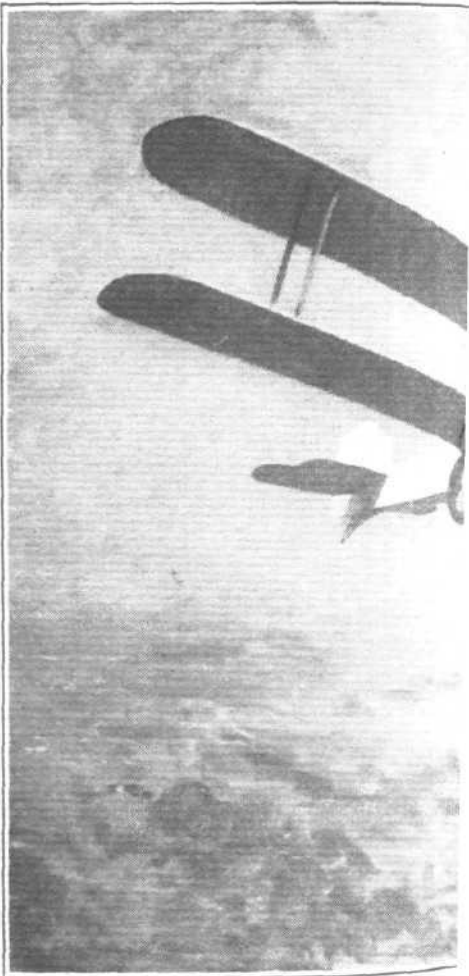
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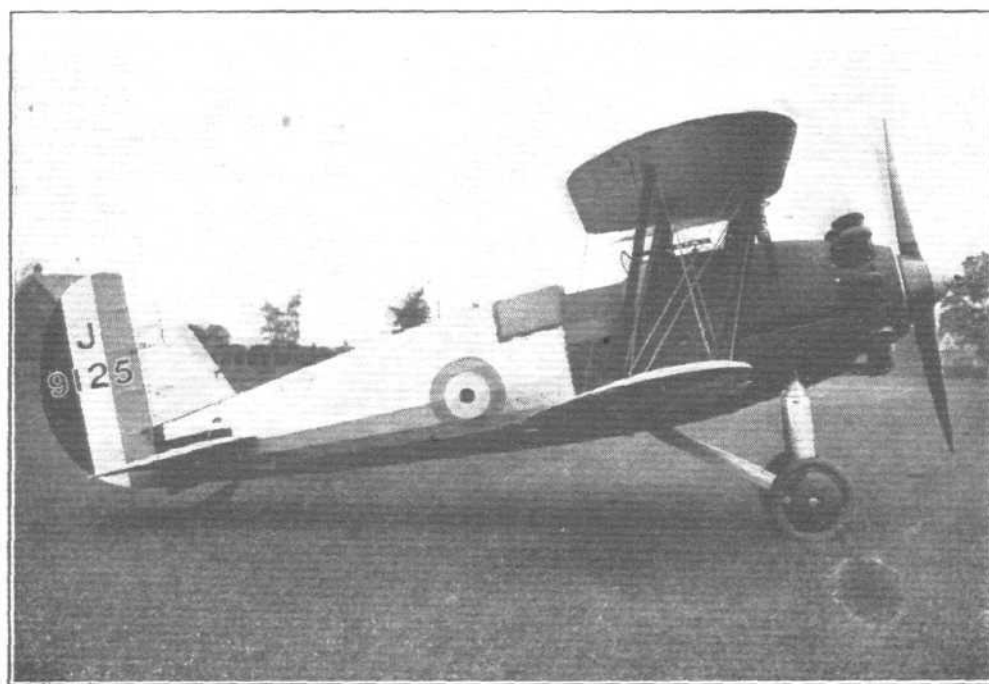
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# THE AIRCRAFT ENGINEER

The slope of the lift curve for each wing is then corrected to an aspect ratio of 6 by means of Fig. 4, and this slope is used for obtaining  $s_1/s$  from Fig. 8.

The downwash angle is given by:—

$$\beta = \frac{\psi}{\left(\frac{s_1}{s}\right)^2 A_w} K_L$$

$\psi$  being dependent on  $s_1/D$  and  $\phi$  (see Fig. 9) where  $D$  is the distance from e.c. on wing to leading edge of tail and  $\phi$  is the incidence of  $D$  to the wing direction.

The total downwash of a biplane is taken as the sum of the downwash due to each wing taken separately.

Since  $1 - b = 1 - \frac{d\beta}{d\alpha}$

and  $\frac{d\beta}{d\alpha} = \frac{d\beta}{dK_L} \cdot \frac{dK_L}{d\alpha} = \frac{a_w \psi}{(s_1/s)^2 A_w}$

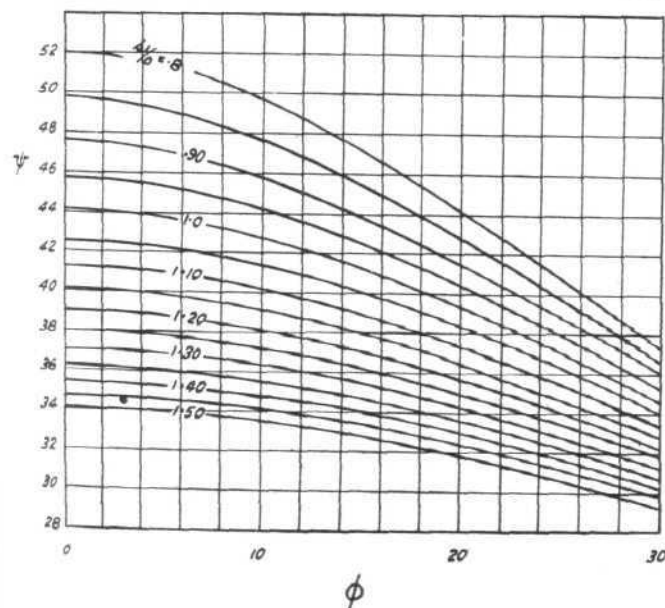
then  $(1 - b)$  (for a biplane) is given by:—

$$1 - b = 1 - \left[ \frac{\psi_1 a_1}{(s_1/s)^2 A_1} + \frac{\psi_2 a_2}{(s_1/s)^2 A_2} \right] \dots\dots\dots 16$$

It is only necessary to obtain values of  $\psi$  at one small angle as it varies very little over the whole range and we are only concerned here with small angles of incidence.

## DOWNWASH FACTORS.

FIG. 9.



All the factors required for the completion of equation 10 are obtainable and an estimate of the tail area to give neutral stability is possible.

It is not always possible nor desirable to have neutral stability. What is far more important is that a means should be available to repeat the stability characteristics of a known machine in a geometrically dissimilar machine working between fixed C.G. limits.

All machines of an aerobatic character are now tested with the C.G. at the fore and aft limit, and if necessary these limits are modified, in accordance with results of the tests. Each firm therefore will have information available from which useful data can be extracted upon which the proportions of future machines can be based so that the longitudinal stability characteristics can be predicted with a fair degree of accuracy.

In all cases the slope of the overall moment of an aircraft can be expressed as

$$\frac{dM}{d\alpha} = K q S_w C \dots\dots\dots 17$$

The value of  $K$  being an indication of the amount of stability.

This new factor changes equation 10 into:—

$$\frac{S_t}{S_w} \cdot \frac{L}{c} = \frac{a_w (x - e) - K}{a_t (1 - b)} \dots\dots\dots 18$$

The value of  $K$  obtained by this means from stable machines will probably be in the region of  $-0.001$  for normal positions of the C.G.

Besides obtaining values of  $K$  for the normal position of the C.G., the values when the C.G. is at the fore and aft limits is also of very great service if the aircraft has been flown with the C.G. at these limits, it gives a means of fixing limits for new types which should be satisfactory on test.

It is not the author's intention to give any actual values of  $K$  as each designer has his own idea of what degree of stability should be obtained for various classes of machines, and therefore no hard and fast rules could be laid down.

In the case of a high wing monoplane or a biplane where the equivalent plane is above the C.G. the calculations should be carried out for small angle of attack—preferably the no-lift angle so that the results may be consistent.

The value of the C.G. position x.c. on the chord should be obtained by projecting the c.g. on to the chord or a line normal to the incidence chosen.

In the case of a low wing monoplane it is suggested that the calculations be made at an incidence corresponding to that half way between no lift and stalling unless the amount of dihedral brings the equivalent plane up to within a short

Table I.

Section.	No-Lift Angle $\alpha_0$	Moment at No- Lift $K_{m_0}$	Slope of Lift Curve "a" for Aspect 6.	Slope of Moment Curve "e."	
R.A.F.	15	-2.5	-0.018	0.0359	-0.242
	25	-3.2	-0.016	0.0363	-0.235
	26	-3.6	-0.028	0.037	-0.251
	27	0	0	0.0378	-0.235
	28	-4.7	-0.020	0.0374	-0.235
	30	0	0	0.0363	-0.25
	31	-6.2	-0.029	0.0366	-0.235
	32	-7.3	-0.069	0.0379	-0.244
	33	-2.6	-0.009	0.0358	-0.243
	34	-1.0	-0.005	0.0401	-0.22
Clark Y	-5.2	-0.04	0.0372	-0.239	
N.A.C.A. C.Y.H.	-3.0	-0.0153	0.0373	-0.238	
Gottingen	387	-7.2	-0.05	0.0355	-0.244
	426	-6.9	-0.046	0.038	-0.255
	429	-0.4	-0.002	0.0375	-0.241
	436	-5.2	-0.035	0.0355	-0.241
	449	-8.3	-0.056	0.0357	-0.232
M	12	-1.5	Doubtful	0.0364	-0.235

distance of the C.G. In this case the relative movement of the C.G. on the equivalent plane is small and a small angle of attack can be used.

To assist in the calculations Table I has been compiled, giving the principal data for a few aerofoils in more common use.

This data includes the no-lift angles, moments at no-lift and the slope of the moment and lift curves.

In conclusion I wish to express my thanks to Messrs. A. V. Roe & Co. Ltd. for the facilities afforded me in the preparation of this article.



# THE AIRCRAFT ENGINEER

## IN THE DRAWING OFFICE.

### A SIMPLE METHOD OF CONSTRUCTING AND DIMENSIONING ELLIPTIC FUSELAGE SECTIONS.

By IVOR E. JAMES.

For high-speed aircraft, in the design of which every effort is made to reduce wind resistance to a minimum, it has been found that the fuselage of elliptic cross section and well streamlined from front to rear is admirably suitable. Owing, however, to length of time required in constructing, dimensioning and making templates for elliptic sections, many designers prefer to compromise by adopting oval sections which can be drawn in with a few suitable radii.

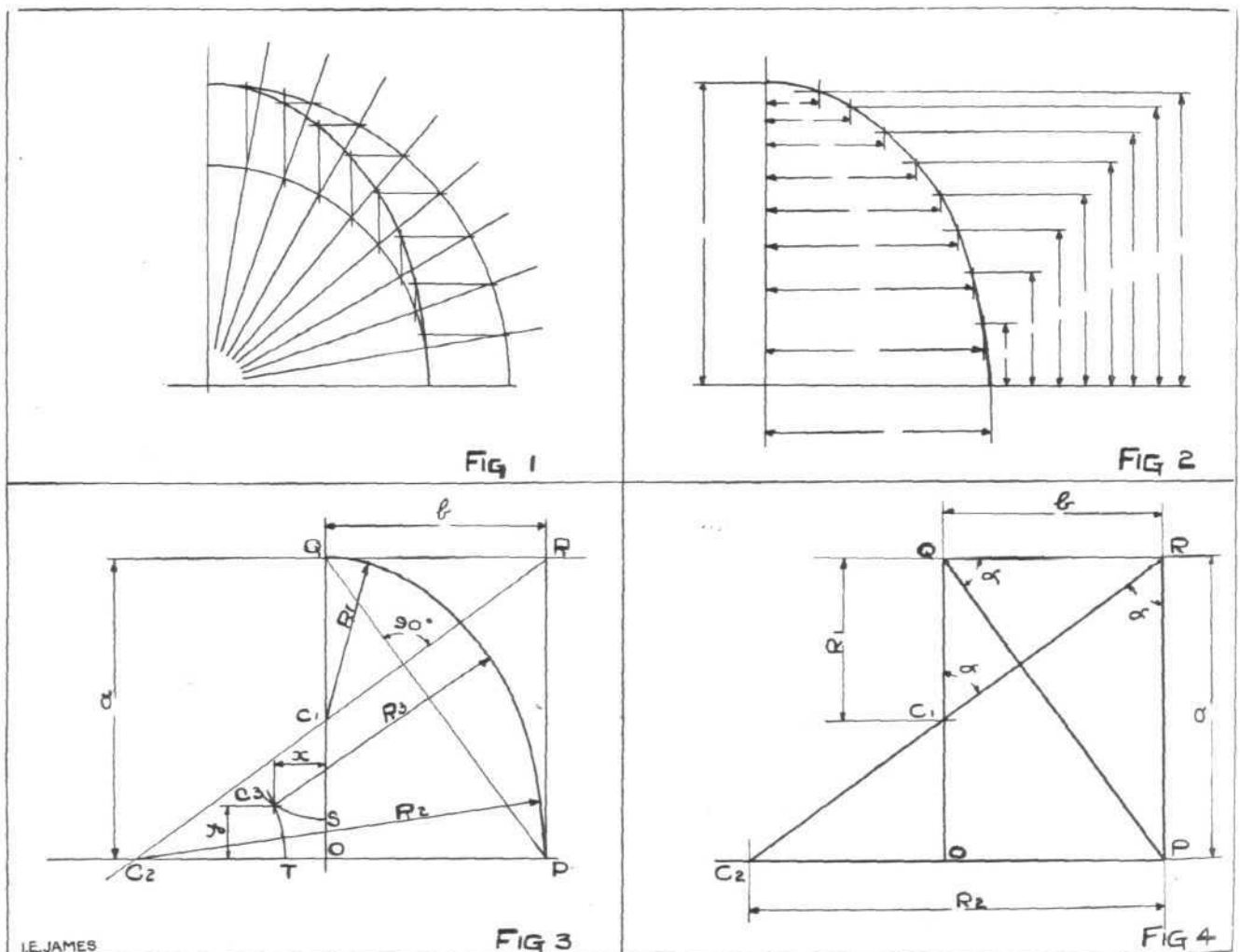
Fig. 1 shows the old-fashioned method of constructing an accurate ellipse, and Fig. 2 indicates the method of dimensioning same. When it comes to constructing, dimensioning and making templates for 20 to 30 such sections for a com-

plete fuselage, the amount of work required becomes formidable. Draw QR and PR, respectively parallel to the axis OP and OQ. Join QP. Through the point R draw a line perpendicular to QP. Let this line intersect the axis at  $C_1$  and  $C_2$ , respectively. Then with centre  $C_1$  and radius  $C_1Q$  draw an arc  $a_1$ ; with centre  $C_2$  and radius  $C_2P$  draw an arc  $a_2$ .

$$\text{Make } PT = QS = \frac{a + b}{2}$$

With centre  $C_1$  and radius  $C_1S$ , draw an arc  $a_3$ . With centre  $C_2$  and radius  $C_2T$ , draw an arc  $a_4$  to intersect  $a_3$  at the point  $C_3$ . With  $C_3$  as centre, it will be possible, with a suitable radius to describe an arc which will join up tangentially with arcs  $a_1$  and  $a_2$ , making a very close approximation to the true ellipse.

The ellipse is thus dimensioned up by three radii  $R_1$ ,  $R_2$  and  $R_3$ , the position of  $C_3$  being determined by dimensions  $x$  and  $y$ .



plete fuselage, the amount of work required becomes formidable.

It is the opinion of the writer that, by employing the short method of constructing ellipses described below, it will be possible for the designer to get out a complete set of sections for an elliptic fuselage in less time than for a fuselage of oval section, and with the additional advantage of being certain that, provided the plan and elevation contours of the fuselage form a good streamline shape, the waterlines in both views will form good streamlines, owing to the geometric similarity of the sections.

The simple graphical method of describing an ellipse indicated in Fig. 3 gives practically a true ellipse, provided that the major axis is not greater than  $1\frac{1}{2}$  times the minor axis. Since sections of the average fuselage fulfil this proviso, it is only the exceptional case that will have to be treated by longer methods.

In Fig. 3,

let  $a$  = major semi axis  
let  $b$  = minor semi axis.

If desired, the radii  $R_1$  and  $R_2$  can be determined theoretically from the geometry of construction.

In Fig. 4, since the triangles  $RQC_1$  and  $QRP$  are similar

$$\therefore \frac{R_1}{b} = \frac{b}{a} \quad \therefore R_1 = \frac{b^2}{a}$$

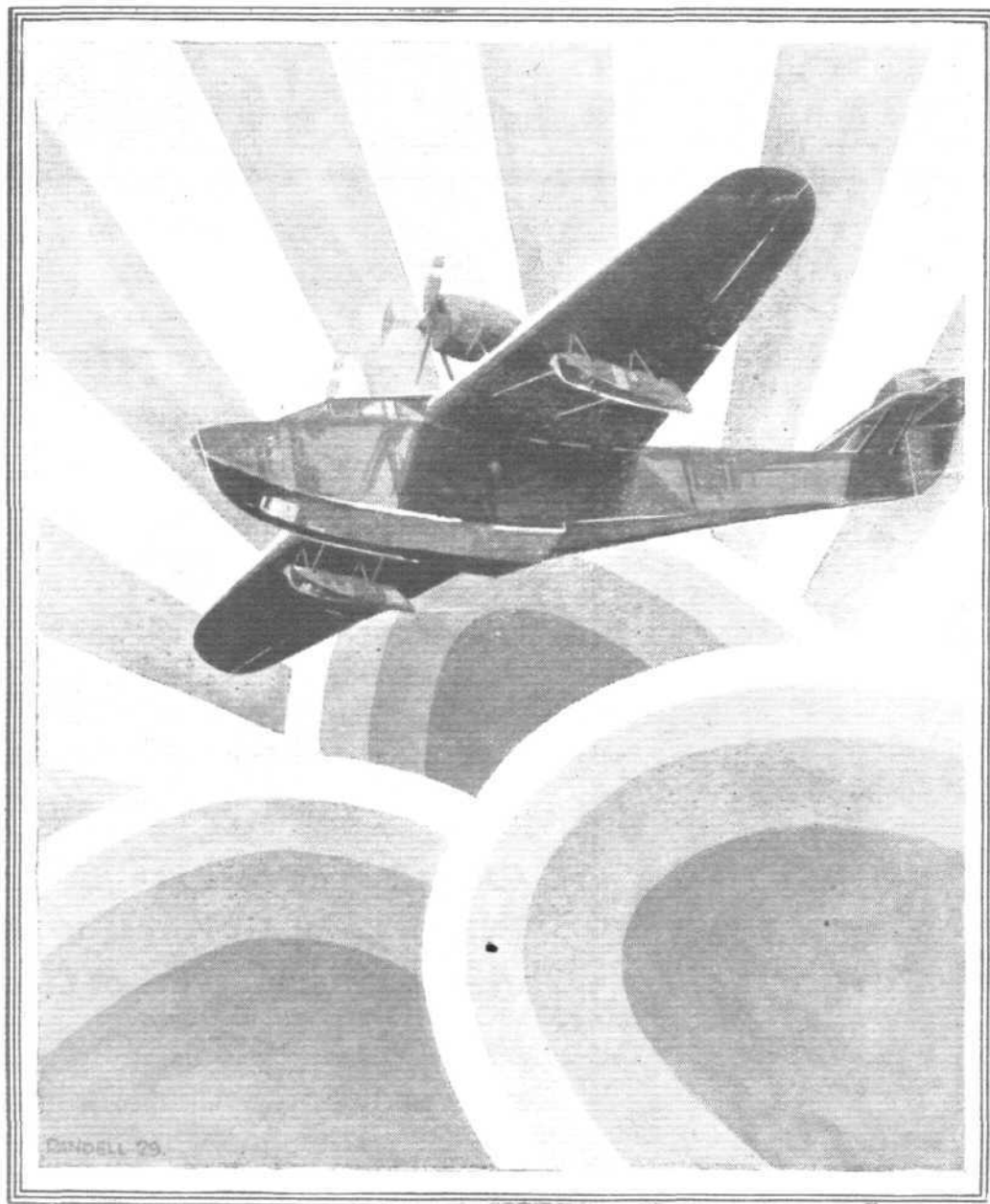
And since also the triangles  $RPC_2$  and  $QRP$  are similar,

$$\therefore \frac{R_2}{a} = \frac{a}{b} \quad \therefore R_2 = \frac{a^2}{b}$$

Thus, given a series of values of  $a$  and  $b$ , it is possible to rapidly calculate the values of  $R_1$  and  $R_2$ . Since, however, there is no simple formula for calculating values  $x$ ,  $y$  and  $R_3$ , it is advisable to find these graphically, as shown.

The required dimensions may be set out in column form by giving for each section the values:—

$$a, b, R_1 = \frac{b^2}{a} \quad R_2 = \frac{a^2}{b} \quad x, y, R_3.$$



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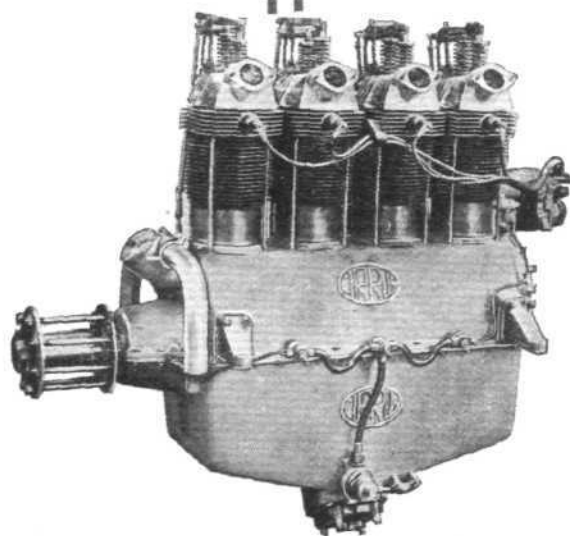
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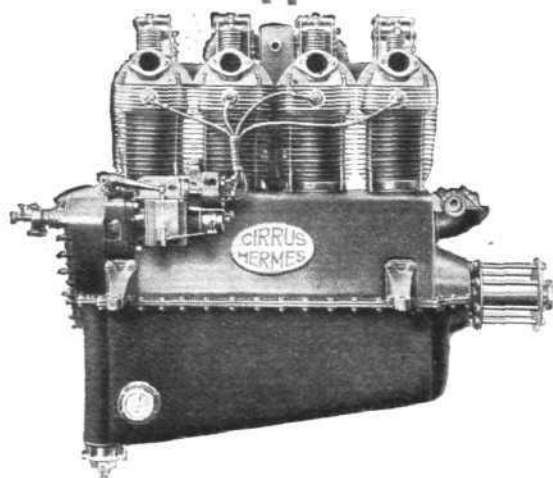
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Escola Militar di Aviacao,  
Centra Portugal  
Estonian Military Air Force.  
Esquadilhas de Aviação  
Republica, Alverca  
Fairey Aviation Company  
Finnish Ministry of Defence  
Focke Wulfe A. G.  
Government of Argentina  
Government of India  
Greek Naval Air Service  
Gnome & Rhone Company  
Grupo Independente de Aviação  
Protecao e Combate, Tanco;  
Hispano-Suiza Co.

Hampshire Aero Club  
Holton Aero Club  
Imperial Japanese Navy  
Imperial Airways, Ltd.  
Inspeccao da Arma de Aeronautica,  
Alvarca, Portugal  
Isotta Fraschini Company  
Junkers Flugzeugwerke A. G.  
Johannesburg Light 'Plane Club  
Latecoere Air Company  
Light Planes (Lancs) Ltd.  
London Light Aero Club  
L. J. Sky-Trips, Ltd.  
Liverpool Aero Club  
Latvian Military Air Service  
Leichtflugzeubau Klemm-Daimler  
G. m. b. H.  
Lithuanian Air Force  
Newcastle Aero Club  
Norfolk & Norwich Aero Club  
Northampton Aero Club  
New Zealand Air Force  
Norwegian Air Force  
N. V. Nederlandshe  
Vliegfabriek "Fokker"  
Mercedes Daimler Benz

Oesterreichische Luftverkhers A. G.  
Port Elizabeth Light Aeroplane  
Club  
Portuguese Naval Air Service  
Royal Dutch Air Lines (K. L. M.)  
A. V. Roe & Co.  
Supermarine Aviation Works, Ltd.  
S. E. Saunders & Co., Ltd., Cowes  
Suffolk Aero Club  
Scottish Aero Club  
Siemens & Halske  
Soc. An. Piaggio  
Soc. Aviolinee Italiane  
Soc. Transadriatica, Venice  
Syndicato Condor, Brazil  
Soc. Construizioni Meccaniche  
Aeronautiche, Marina di Pisa  
Soc. Navigazione Aerea, Genoa  
Taxiplanes, Ltd.  
Western Aviation, Ltd.  
Westland Aircraft Works  
Walter a Spohl  
Western Australian Airways, Ltd.  
Weiss Manfred Werke, Hungary  
Yorkshire Aero Club  
Yugo-Slavian Naval Air Service

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# ACCESSORIES, COMPONENTS and EQUIPMENT

## AC Sphinx Sparking Plug Co., Ltd. (31), Bradford Street, Birmingham.

The AC aircraft plug type "N" which was used by Col. Lindbergh in his Atlantic flight (also in other successful Atlantic flights), exhibited on this Stand, has a porcelain insulator, like all other AC aircraft plugs, since porcelain may be maintained at a high temperature for long periods without deterioration. The AC "NN" plug is of a similar type designed to stand greater heat than the "N" type.

In addition to these two plugs there are other AC models which are more suitable for use on joy-riding machines, where the engine spends almost as much time on the ground as in the

thing relating to steel tubes for aircraft, and their exhibit is comprehensive of all the applications of tubes to aircraft up to date. Examples of every form of tube manipulation are shown—bending, tapering, taper-gauge, coiling, flanging, butting, reducing, expanding, welding, etc., and the British Air Board and foreign specifications are represented among the exhibits. Specific component parts exhibited are: spar, streamline and other special sections, axle tubes, plain and taper gauge, straight and bent, tapered struts, tubular rivets, exhaust manifolds, etc. There is an exhibit of tubular box spanners made from 80-ton tensile steel. Accles and Pollock have made exhaustive experiments with chrome molybdenum steel, which they recommend as an efficient all-round material for aircraft construction. They are preparing a pamphlet setting forth the qualities of this material, and visitors are recommended to obtain a copy of this literature; it is entitled "Chrome Molybdenum—the All-Purpose Aircraft Steel."

## Aeronautical and Panel Plywood Co., Ltd. (1), 218-226, Kingsland Road, London, E.2.

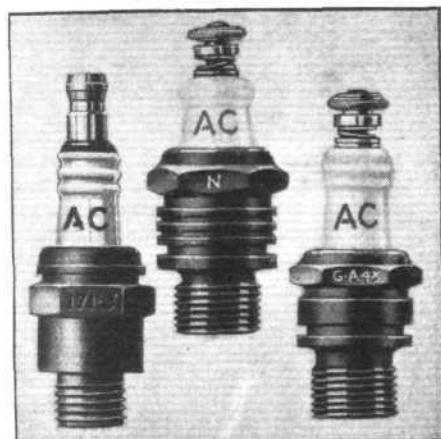
Despite the increased preference for all-metal aircraft, there is still a large demand for wood, and particularly plywood, which is almost essential in some sections. It is used widely for fuselage decking, fairings and instrument boards, even on metal machines. Wood is also used for the construction of leading edges. Appropriately enough, this company's Stand is constructed of "Mallite" aeronautical plywood throughout, including the furniture. They also show various sections revealing the many applications of plywood to modern aircraft. Metal-faced plywood and plywood moulded into various shapes, and fireproof plywood, are also on view. Their "Balsa" plywood, which is the lightest wood in the world, is very much used in large aircraft for partitions, panelling, etc. It is used extensively on the new airship R.101, the doors, tables, stair-treads, landings, etc., all being

constructed of this Balsa plywood. Another product of this company is an exceedingly thin plywood only 8 mm. thick. Each of the three layers which comprise this plywood is only 1/100th in. thick. It bends like parchment, but is very strong and durable.

## Aircraft Operating Co., Ltd. (C. 187), 8, New Square, Lincoln's Inn London, W.C.2.

The art of aerial photography, of which the Aircraft Operating Co., Ltd., are pioneers, is exemplified on their Stand. Comprehensive examples of aerial photographs and the maps made from these photographs, the examples having been selected from surveys undertaken by the company in the Colonies and in foreign countries, are on view. Also specimens of photographic maps, prepared as the result of surveys by the company, are seen, ranging from those on a scale of 63 in. to the mile, made in connection with the survey of Rio de Janeiro for town-planning purposes, to those on a scale of four miles to the inch in the case of the reconnaissance surveys carried out for the Government of Northern Rhodesia.

In addition to topographical maps, the different uses to which aerial photography can be applied are shown. Examples show the application of aerial photography to geological surveys, to railway location work, and to the revision of large-scale maps of developed country, as instanced in the revision work recently undertaken for the Ordnance Survey, and examples of aerial photography as applied to archaeological research, with specimens showing traces of ancient civilisation in Mesopotamia, which were obtained when the company was carrying out an air survey for the Government of Iraq. The various special instruments which have been built to the Company's design to assist in the work of preparing maps from photographs are exhibited, and a special air survey aeroplane built by the Gloster Aircraft Co., Ltd., to the order and specification of the Aircraft Operating Co., is staged on the Gloster Aircraft Co.'s Stand.

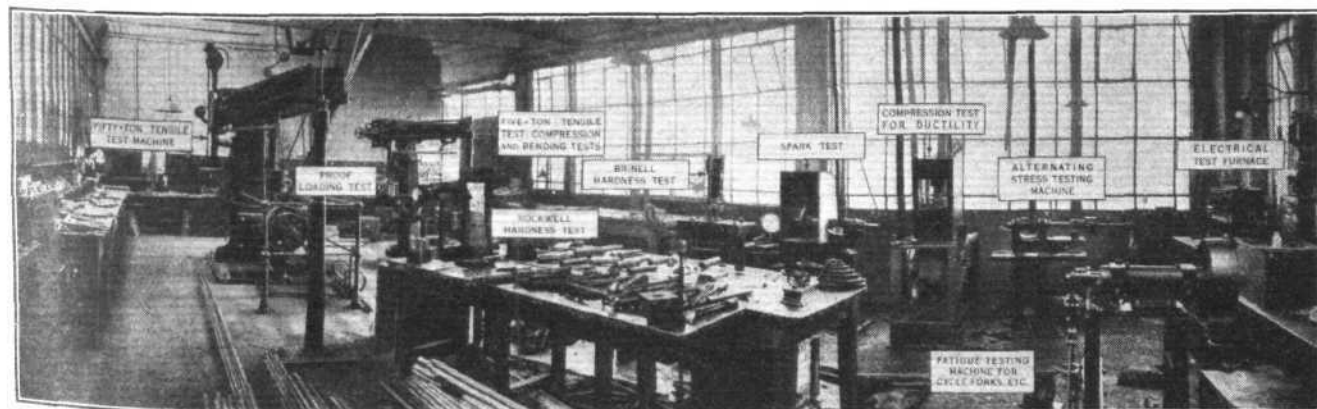


Three "AC" Sparking Plugs.

air, and also a range of special plugs for use on very hot engines, more particularly of the super-charged type, where they are subjected to a large amount of oil as well as excessive heat. A further range of AC plugs recently introduced is a series of 12-mm. plugs constituting a range capable of covering all engine conditions. A range of fuel pumps is also shown.

## Accles and Pollock, Ltd. (166), Oldbury, Birmingham.

The name of these manufacturers needs no introduction to the aircraft world. This firm are pioneers in every-



A view of the Test House of Accles and Pollock, Ltd., where the steel tube work for aircraft is inspected, etc.



**Aircraft Materials, Ltd. (132).**

Midland Road, London, N.W.1.

A variety of materials and components to the specifications of the Air Ministry and the British Engineering Standards Association are here, with a full range of specimen steels for aircraft and engine construction, especially the higher grades of nickel chrome and stainless. An instructive group of tensile, nicked fracture, and Izod test specimens carried out on a large number of steels is displayed with micro-photographs. The range of products supplied by this company is illustrated by a display of photographs showing the large variety of aeroplanes, seaplanes and engines.

**The Aircscrew Co. (129).**

Weybridge, Surrey.

Wooden propellers manufactured by this company are in demand throughout the world. Light planes now absorb a large and increasing number. On the Stand are seen small propellers for the Gipsy and Cirrus engines, neatly finished with cellulose lacquers or paint. One of particular interest is for the Beardmore engines which are to be installed in R.101. A Napier engine fitted with a Weybridge wooden aircscrew, and a large four-bladed aircscrew are other types. Testimony to the durability of these aircscrews is a record of 3,000 hours.

**Air Survey Co., Ltd. (158).**

39, Grosvenor Place, London, S.W.1.

Photographic examples of the work accomplished by this firm, regarding that important and rapidly growing branch of aviation, Air Survey. They display a number of photographic mosaics and maps of considerable interest. This company—of whom the principals are Col. C. H. Ryder, R. C. Kemp and F. P. Raynham—have carried out important contracts in India and the East.

**Airwork, Ltd. (119).**

Albion Lodge, Cranford, Middlesex.

Here is a scale model of Heston Air Park, on a base 5 ft. square, which shows the complete layout of the new air park with club house, large service hangar, private owners' lock-up hangar, and manufacturers' or concessionaires' depot hangars. It also shows the plans for future development. Then there are scale models of the D.H. "Moth," the Avro "Avian," and the Blackburn "Bluebird," the three standard types of machine which they propose using on the aerodrome for school and taxi-work. In addition are numerous photographs giving details of the aerodrome buildings and facilities offered, together with plans and maps of the location of the Air Park, which is likely to become one of London's most popular aerodromes and social centres for the aviation community. Mr. Nigel Norman and Mr. F. A. I. Muntz are the directors and originators of the whole scheme.

**Aluminium (II) Ltd. (174).**

Bush House, Aldwych, London.

These suppliers of aluminium and its alloys in all forms, suitable for use in aircraft construction and conforming to required specifications, are exhibiting examples of their products, such as aluminium sheet, aluminium tubing, strong alloy sheet, strong alloy rod and bar, strong alloy tubing (round, square and irregular shapes), etc. Their forgings are made from strong alloy supplied by The Birmingham Small Arms Co.,

Ltd. Samples of forged aero-engine crankcases and aircscrews are also shown.

**Anglo-American Oil Co., Ltd. (30).**

36, Queen Anne's Gate, Westminster, S.W.1.

This company's Stand draws instant attention to its well-known fuels: Pratt's motor spirit, Pratt's aviation spirit, and Pratt's Ethyl petrol. A new line which the company has only recently introduced is Pratt's motor oil. This oil has been designed to meet the requirements of modern high compression and fast "revving" engines. Before being put on the market, Pratt's motor oil was subjected to the most exhaustive test to which a lubricating oil has been subjected.

Their exhibits show, pictorially, a few of their successful efforts to assist the pioneer work of aerial development. The machines which won such notable events as the first solo Atlantic flight (Lindbergh), and the Schneider Trophy for Britain, are most attractively displayed in coloured, cut-out drawings.

Pilots flying abroad can now be assured of obtaining their proper supplies of Pratt's petrol and oil at all Continental aerodromes at which they propose to land. Pratt's spirit is now used exclusively by all the Air Union liners. Incidentally, the extensive use for commercial purposes of the company's Westland "Widgeon," "Miss Ethyl," has resulted in the purchase of another machine for a similar purpose.

**Auster, Ltd. (74).**

Crown Works, Barford Street, Birmingham.

There is a representative range of Auster and Auster-Triplex windshields, a selection of fuselage fittings and various adaptations of the lightning fastener for aircraft. The Auster windshields shown have been designed specially for a number of different types of aircraft, from light 'planes up to big commercial or bombing 'planes. There is thus a great variety in the shapes and sizes of these windshields. Furthermore, each windshield being designed for one particular type of aircraft, the former can be made to blend or conform with the general lines of the machine—in other words, the aircraft have their windscreens "made to measure" and not "ready-made."

**Austin Reed, Ltd. (153).**

Regent Street, London.

There was a time when nobody bothered to design special clothes for the airman. It was considered that all he required were a few jerseys. But now the position is different. For instance, Austin Reed, Ltd., the well-known tailors, produce some excellent gear. On their stand you can see the very efficient and smart two-piece suit which fits tightly round the ankles and can be turned up closely round the neck.

On each knee is a fine capacious pocket, both extremely handy when flying. There is also a large pocket on the front above the waistline, conveniently slanting upwards, ready for slipping in one's notebook or map.

This company also shows a very neat leather flying jacket with those snappy lightning fasteners, also special flying gloves, which have fingers, but also an additional warm fingerless covering, which can be slipped over the fingers. Other exhibits include goggles and flying helmets.

**Auto-Auctions, Ltd. (42).**

Burlington Gardens, Old Bond Street, W.1.

Auto-Auctions, Ltd., have the world distribution of Blackburn "Bluebirds," which they exhibit, including the experimental all-metal "Bluebird IV" on which Squadron-Leader L. H. Slatter, D.S.C., D.F.C., O.B.E., flew from England to South Africa in the early part of this year, and which was recently shown in the windows of their excellent new showroom at Burlington Gardens. Also on this Stand are the Cirrus Mk. II engine and the complete "Bluebird" metal float which was used last year and this year by Col. the Master of Sempill on his tours in a "Bluebird III" seaplane. During the summer of 1928 Col. Sempill flew this seaplane on a long pleasure tour round the British Isles.

**Automotive Products Company (147).**

3, Berners Street, London, W.1.

Their Lockheed hydraulic braking system for aircraft, which operates on a special fluid supplied by the company, is exhibited on a fuselage and tail unit, whilst their other exhibit is the Purolator aircraft filter, a simple trouble-proof filter through which a stream of crankcase oil is circulated continuously in sufficient volume to assure proper filtration of all oil in the crankcase. As regards the brake, this is based on the same principle as that employed in the well-known Lockheed hydraulic brakes now in use on many thousands of motor-cars, both in England and in America.

In its application to aircraft it is brought into operation, automatically, by the tail skid, which as soon as it touches the ground (when landing) applies pressure to the brake shoes in the hubs of the landing wheels. Diagrammatic lay-outs showing the inter-connection with the rudder bar for combined steering and braking of the machine when landing, with individual and separate control by the pilot or automatic control as required, are also exhibited on this Stand.

**Birmingham Medal Co., Ltd. (184).**

Summerhill Terrace, Parade, Birmingham.

Scale model aircraft manufactured in metal in the form of trophies, car mascots, advertising lines; enamelled badges of every description for aero clubs and similar organisations, nameplates, dial plates and badges in all metals, suitable for the aero and motor trades; challenge trophies and special models of every description, challenge cups and shields, are all on view here. The models of aircraft include the "Bluebird," "Spartan," "Avian" and "Moth."

**James Booth and Co. (1915), Ltd. (165).**

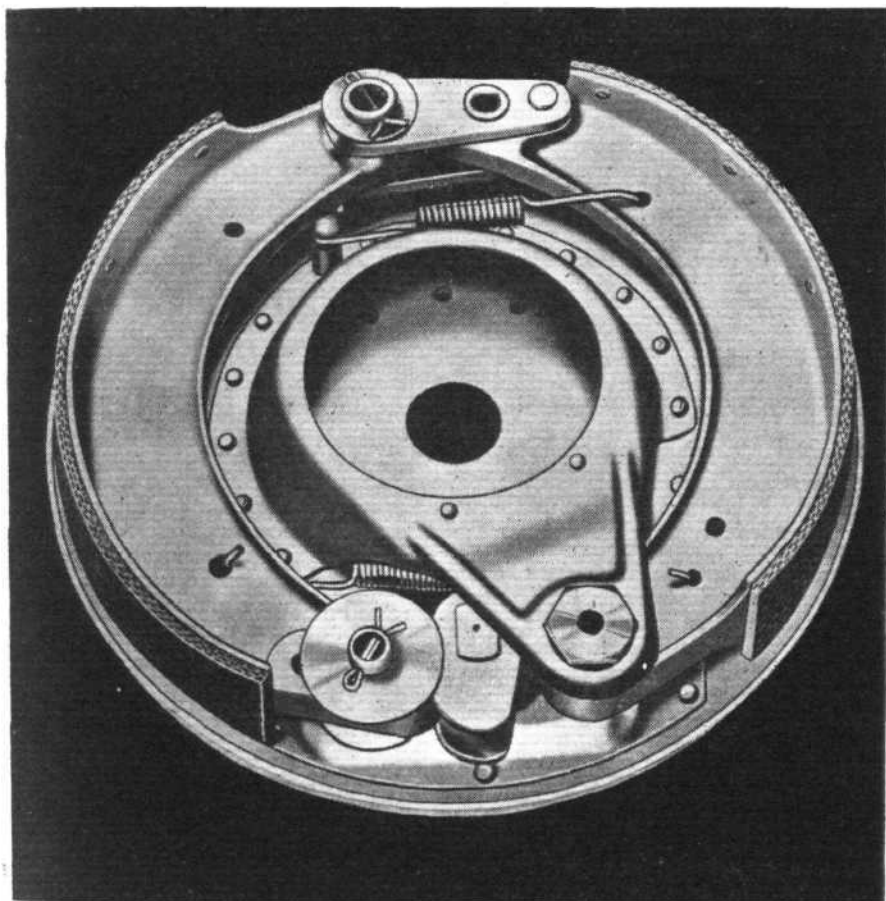
Argyle Street, Nechells, Birmingham.

These exhibitors have led the way in the production of Duralumin in all its forms for use in aircraft and in the problems of research incidental to that use. Duralumin, Y. Alloy, brass, and copper for all types of aircraft and aero engines are exhibited. Duralumin sheets heat-treated to British Standard specification, annealed or hard-rolled (up to 10 ft. in length and up to 4 ft. in width), strip in coil up to 18 in. in width, tubes solid drawn, shaped tubes, extruded bars, extruded sections, rolled and

drawn window pulls, open-joint tubes, flanged channels, corrugated sections, wire, hammered bars of all sizes, and drop-forgings, connecting rods, stampings, hand-forged bar, crank-cases, propeller blades, piston stampings. In Y-Alloy there are sheets in all gauges, hand forgings, bars, and drop-forgings. In copper and brass—tubes, cold-rolled sheets and strip, extruded rods for high-speed turning and for hot stampings, hollow rods, red metal and yellow, aluminium, manganese and high-tensile bronze, rods of riveting and bending quality, extruded channels, nosings, treads, sectional shapes, curtain rails, H.C. copper for electrical requirements in sheet, tape, strip, bars, section and tubes, arsenical copper wire for cables, commutators, trolley-work.

**D. H. Bonnella and Son, Ltd.** (190),  
46, 48, Osnaburgh Street, London,  
N.W.1.

Aero-engine component parts, aircraft electrical equipment, lighting and ignition accessories, are manufactured by this company for most of the aircraft industry. They recently introduced new plant at their works for the production of Bakelite mouldings, which are extensively used in aircraft. This plant included the latest types of hydraulic presses. Cockpit lamps, dimmers, four-way socket and plug, four-way high-tension cable clamps, adaptors for magnetos, terminal lugs. Joint boxes for screened magneto leads, and cable-bonding clamps are among their products.



**The Bendix-Perrot Brake for Aircraft.**

**Bendix-Perrot Brakes, Ltd.** (131),  
Westwood Road, Witton, Birmingham.

The Bendix wheel with its brake as exhibited here has a perfect streamline form. This is an advantage obtained at no expense in strength or weight, but, on the contrary, the very streamline form adds to the side load strength of the wheel. The brake itself is of the well-known two-shoe Servo type, which has been in actual service for the past seven years on some of the best known makes of cars in the world. It is a powerful brake and at the same time perfectly controllable. A minimum amount of pedal movement is needed to obtain full braking effect, and yet there is smoothness combined with controllability which is vital to easy and safe operation. Except for the springs, anchor pin and camshaft, all parts of this brake are made of high-duty aluminium alloy in a form which gives minimum weight with maximum reliability and strength.

**S. F. Bowser and Co., Inc.** (7),  
Windsor House,  
Victoria Street,  
London, S.W.1.

This exhibit centres round the Bowser aircraft fuelling pit, and includes a very complete range of petrol pumps, fuelling meters, and oil-storage equipment, such as are suitable for use in all completely equipped aerodromes. The range covers power driven pumps of types which would be suitable for fuelling the fleets of motor tenders used by big aerial transport companies, etc. This type of equipment pertains chiefly to flying schools, flying clubs,

and municipal aerodromes used by business men in making a trip to another commercial centre, and picking up their cars again on the return trip.

**Bray, Gibb and Co., Ltd.** (26-C),  
166, Piccadilly, London, W.1.

In their capacity of insurance brokers, this company is not exhibiting in the true sense of the word, of course, but they have an interesting stand showing correspondence in connection with aviation insurance from such pioneers as Colonel Cody, Gustav Hamel, etc., which are of no small interest to people interested in aviation, particularly the late comers to the industry.

The company were pioneers of aviation insurance in this country.

**British Aluminium Co., Ltd.** (165),  
Adelaide House, King William  
Street, London, E.C.4.

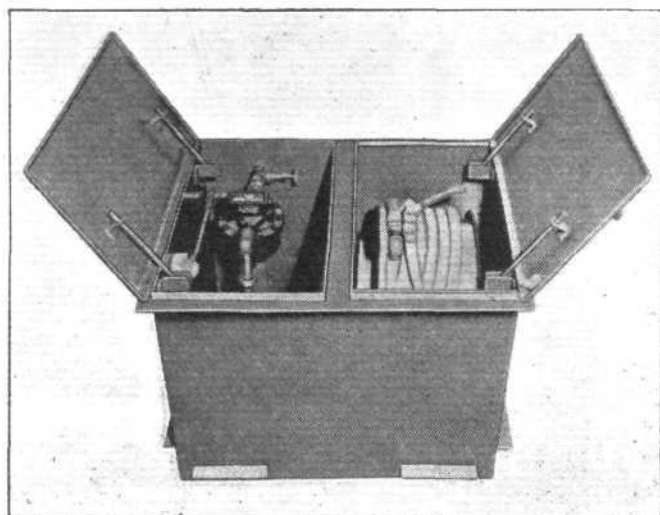
Various applications of aluminium in aircraft forms the subject of this firm's exhibit. Unfortunately, it is hardly one that lends itself to description, although to the actual visitor to the Stand—especially if he be concerned with the subject—there is much of interest to be seen.

We can only mention, therefore, the various items displayed:—Ingots of aluminium, and alloys 2L5, 2L8, and 3L11. Plates and sheets in pure aluminium and in silicon alloy. Aluminium tubes, sections and rods. L32 alloy rod. Aluminium rivets and powder, etc.

**British Celanese, Ltd.** (152),  
Celanese House, Hanover Square,  
London, W.1.

British Celanese, Ltd., are exhibiting a full range of their cellulose acetate dopes and varnishes, together with a comprehensive display of their Celastoid and Cellastine. The dope manufactured by the company was specified on British aeroplanes during the war, because of its peculiar tautening, hardening and fire-resisting properties. Since 1918 it has been widely used on record machines.

Celastoid sheets are being very much used in the making of windscreens, goggles and side-curtains, their non-inflammable, non-discolouring and non-splintering qualities making them admirable for this purpose. Manufacturers of aeroplane accessories find Cellastine moulding powders excellent material for making gauges, fascia boards, instrument dials, panels, etc.



**The Standard Bowser Aircraft Fuelling Unit.**



**British Petroleum Co. (170),**  
Britannic House, Moorgate, London,  
E.C.2.

This is another of those exhibits that hardly lends itself to a description. "B.P." motor spirits, in fact, do not need any description, for their successes in the various spheres of mechanical transport—land, sea, and air—are well known. On this Stand, however, one may learn all about "B.P." Aviation spirit, the new "B.P. Motor spirit, and "B.P." Commercial motor spirit.

There are also displayed exhibits showing the various methods of the refining, storage, and distribution of "B.P."

**British Piston Ring Co., Ltd. (137),**  
Holbrook Lane, Coventry.

"Brico" piston and scraper rings as shown here are made from "Brico" centrifugal castings made in the company's own foundry, the centrifugal plant being of a specially patented design. "Brico" aircraft rings are specially selected and individually tested throughout the process of manufacture, absolutely eliminating all possible doubtful products. Of the scrapper rings, the grooved and drilled type is one which they have particularly developed. In addition, they supply the ordinary stepped, bevelled, and slotted and grooved types. These also are on view.

**British Russell Parachute Co., Ltd. (41A),**  
423 and 423a, Edgware Road,  
London, W.2.

Chief characteristics of this parachute which differs from other types are the "Lobe" shape of the canopy and the absence of a pilot parachute to pull the main parachute out. The "Lobe" shape contributes to the slow rate of descent and checks oscillation during descent.

Exhibited on their Stand at Olympia is a full range of types. There is the Seat Pack complete with harness and accessories, also the Back Pack, both types being manufactured of silk. A third type is a cotton Seat Pack, identical in design with the others, but its canopy is manufactured of cotton. The tensile strength of the cotton is not so high as that of the silk, so that silk types are used when severe strains are imposed—for example, when jumping from machines flying over 110 m.p.h.



**The British Russell "Lobe" Parachute.**

One understands that more recent experiments have been carried out, which further improve the performance of the parachute. A slight alteration in the canopy structure reduces oscillation even more whilst the shock load on opening is said to be lightened.

**British Thomson-Houston Co., Ltd. (173),**  
Rugby.

This is a comprehensive exhibit of B.T.-H. aircraft magnetos, impulse starters, inertia starters, lighting generators, aerodrome lighting equipment, etc. B.T.-H. magnetos are suitable for engines having any number of cylinders from two to 16. Included in the range shown are magnetos of the rotating armature, polar inductor and two-point ignition types. As far as possible, parts of magnetos of different form, but of the same type, are made interchangeable, whilst it should also be noted that the magnetos may be divided into two main types, rotating armature and polar inductor.

The B.T.-H. impulse starters are generally used on smaller aircraft engines. Their Inertia starters provide an easy method of starting large internal-combustion engines either electrically or by hand. As well as the inertia starters described, a starter for commercial 'planes is that known as the "aviation hand turning gear," designed for engines of 900 cub. in. up to 2,000

cub. in. capacity. For engines of 250 cub. in. and 400 cub. in. capacity motor-driven turning gears are available. Both the inertia starter and hand turning gear can be seen on exhibited engines.

**Brooklands School of Flying, Ltd. (180),**

Brooklands Aerodrome, Byfleet,  
Surrey.

This exhibit consists of a part section of a D.H. "Moth" fuselage complete with controls and instrument boards, and a collection of photographs. As this Stand is really in the nature of an "Inquiry" office, or "Recruiting Station" in connection with their successful Flying School, little more can be said regarding this exhibit.

**Brown Brothers, Ltd. (70),**

Great Eastern Street, London.

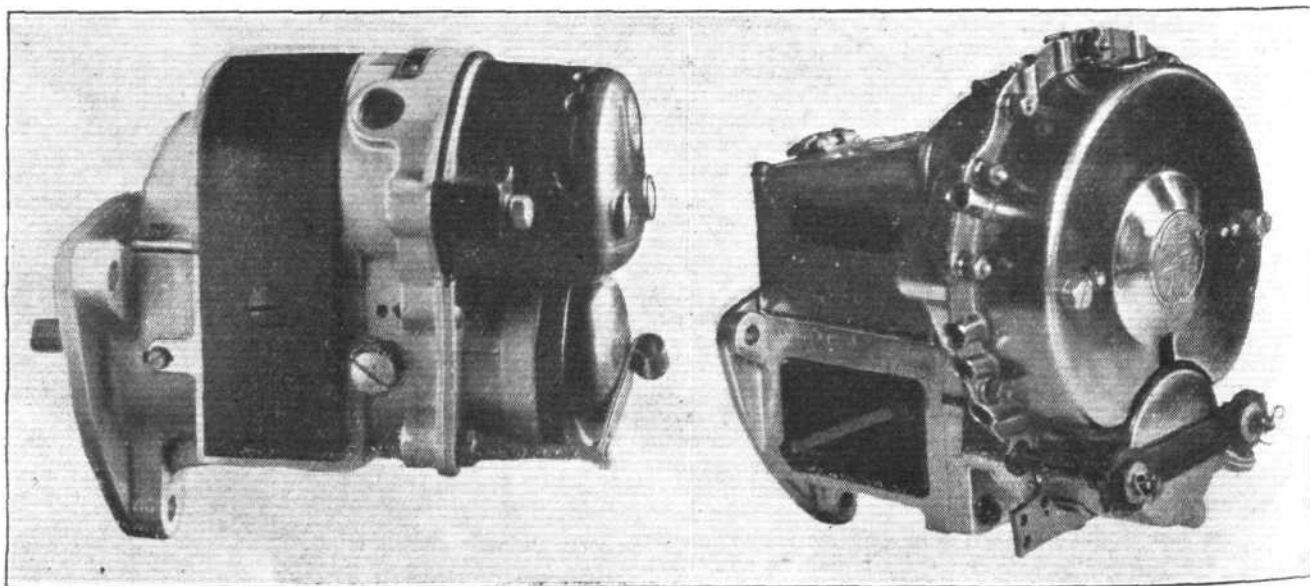
These specialists in aircraft fittings and parts show their manufactures, made in mild steel, stainless steel, high-tensile steel and Duralumin, of such things as nuts, bolts, washers, turnbuckles and fork joints, and parts liable to erosion, in cadmium and zinc coating. Other parts shown are petrol cocks, valves, and drain cocks in Duralumin which have been anodically treated to prevent erosion. Standard pipe couplings, together with pipe-expanding tools, petrol flex. tubing, and couplings have their place. Everything of the latest pattern in the way of bonding clamps, cleats, insulators and sockets, together with a good range of standard fittings used for the make-up of wireless equipment, are further items. Other exhibits include fabric to specification 4F1, frayed fabric D.T.D.75, propellers, streamline wires and swaged rods, high-tensile steel wire in all gauges, the Lodge aero plugs, and a representative selection of instruments.

Demonstrations are given of the inspection of aircraft parts which will be in every respect identical with the work of the Inspection Department of Brown Brothers, Ltd., which was given official approval by the Air Ministry six years or so ago.

**Bruntons (47),**

Wire Mills, Musselburgh, Scotland.

We understand that this company was the first in this country to produce swaged tie rods for aircraft. As far back as 1907 they supplied steel tie



**Two B.T.H. Aero Magnetos : The G.L.5 and S.C.12-7.**



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## **BEARINGS**

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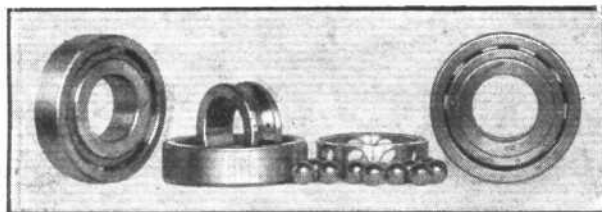
### **The Winner of the King's Cup**

The Gloster Grebe with Jaguar Engine  
by Armstrong Siddeley Motors Ltd.,

and to

The D.H. Moth with Cirrus III. Engine  
by Cirrus Aero-Engines Ltd.,

**gaining Second Place**  
and also winning the **Siddeley Trophy**



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**THE STIEGER MONO-SPAR SYSTEM OF AIRCRAFT CONSTRUCTION.**

Of the greatest possible interest to all concerned in aircraft is any improvement which results in a substantial reduction in structure weight of aeroplanes, with its consequent immensely important increase in "pay load."

Visitors to the International Aero Exhibition at Olympia, London, are invited to inspect our Stand (No. 121), where a Mono-Spar Wing and data on this interesting and unique system of construction will be exhibited and explained in detail.

The structure weight of aircraft in relation to the "all up" weight has, in recent years, become a figure varying from 30 per cent. to 35 per cent. for normal commercial machines with normal factors of safety.

The Stieger Mono-Spar System reduces the structure weight to figures hitherto unattainable. It brings the aero dynamically clean *cantilever monoplane* structure weight actually *below* that of the corresponding *biplane* structure. Further, stress calculations are simplified and manufacturing costs reduced.

All the above advantages are obtained whilst otherwise conforming in every way to normal strength requirements and also complying with the known desirable design requirements in regard to the prevention of Wing-Flutter.

See our Stand No. 121 at Olympia.

THE MONO-SPAR CO., LTD., 4, Broad Street Place, London, E.C.2.

*For Maximum  
Performance,  
Pay Load, Safety.*

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London Wall, 8969

V. Fitz-Gerald

The Mono-Spar Co. Ltd.,  
4 Broad St. Place London E.C. 2

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rods to the British Government for use in the construction of airships and aeroplanes, as well as wire and wire cables. In the exhibit are the following samples of their manufacture:—Streamlines and tie rods—complete with end fittings—electro-plated with zinc, cadmium and chromium. Stainless steel bracing wires, forkends, turnbuckles, control cables, "Beacon" Tru-Lay cables and "Beacon" Tru-Loc fittings—as supplied for the rigging of H.M. Airships R. 100 and R. 101, and as used for control cables and other aircraft—are all there for inspection. Samples of pieces machined from bars of various standard specifications for forkends, nuts, pins, turnbuckles, bolts, etc., including the special Safe Lock forkend, help to complete the exhibit. A souvenir catalogue well worth acquiring is also distributed to visitors.

**Caxton Name Plate Manufacturing Co. (79),**

11, 13 & 15, Rochester Row, Westminster, London, S.W.1.

Here are name plates of several kinds and in various materials for aircraft. Dials and scale plates, altitude, speed, oil, clock and pressure gauge dials, number tablets, dashboard plates, enamelled badges and tread plates, as used by motor-car makers and dealers, machine engraving and dividing, are all arranged for inspection. These products are manufactured of Ivorine of any colour, or in many sorts of metals, in a variety of finishes.

**Cellon, Ltd. (23),**

Cellon Works, Upper Ham Road, Kingston-on-Thames.

In addition to the "Cellon" service types of dope for aircraft which have a world reputation, and "Cerric" lacquers for wood, metal, etc., there are exhibited many neat frames to demonstrate various finishes for privately-owned machines of a more decorative nature than the standard service finish. On a small scale is shown what can be done with these materials, although the best examples are seen on the stands of various aircraft manufacturers, so many of whom are showing machines doped with "Cellon," or in the case of wooden or metal machines they are showing the complete finish with "Cerric" lacquers, which have replaced paint and varnish for this purpose.

A Fairey metal airscrew brightly treated with the "Cerric" lacquer, and a larger propeller for a Bristol "Jupiter" engine, treated with "Cerric," are also on this attractive Stand.

**Chance Brothers and Co., Ltd. (139),**

Lighthouse Works, Smethwick, Birmingham.

The "Chance" aerodrome Flood-light, type C.500, for lighting the surface of aerodromes for night landing, which can be placed either in a fixed position—mounted on a small chassis moved by hand; or on a lorry, is one exhibit here. Another is the unattended Aerial Beacon, which is turned on and off at night and morning by the light-valve. Two Electric Aerodrome Lights, giving short red flashes, produced by an occulting mechanism; and a Portable Acetylene Boundary Light or general purposes warning light, fitted with an automatic flasher, are among other exhibits. One must also mention their "Calorex" glass, which absorbs four-fifths of the sun's heat and is suitable for use in hangars and workshops in

hot countries. It transmits about two-thirds of the light but minimises glare. The heat-absorbing properties are demonstrated by the exhibit.

**The Chloride Electrical Storage Co., Ltd. (196),**

Clifton Junction, Nr. Manchester.

The Exide battery exhibit consists of special batteries for aeroplane starting and lighting. In designing these batteries it has been the aim of the company to obtain maximum capacity within a given size and weight, and to design a plate capable of withstanding the heavy discharges for which these batteries are used. Various types of this class of battery are exhibited, and a selection of plates and component parts are made available for inspection. In conjunction with the exhibits, a specimen working example of the new Keepalite Emergency lighting system is shown. This system demonstrates the automatic lighting of emergency lamps in the event of failure of the ordinary supply of current, and is suitable for use at aerodromes and in numerous other circumstances where continuity of light is essential.

In addition to the usual range of Exide wireless batteries for high tension and low tension, special types suitable for aircraft wireless are features, together with accessories and spare parts.

**Robert W. Coan, Ltd. (150),**

Coan House, Duncan Street, Islington, N.1.

Here are aluminium castings of every description for aeronautical work, both die cast and sand moulded, such as the 36-in. diameter Scarfe gun mountings, crank cases, pistons, and numerous other parts for carburettors, clinometers, barometers, wireless and other instruments. Some of the parts supplied for the airships R.100 and R.101 are also on view, as well as castings made in "Coanailium" alloy (a special alloy for seagoing purposes), which has a very good tensile strength, a high percentage of elongation, and has withstood the six months' sea-water test.

**Alan Cobham Aviation, Ltd. (140),**

150, New Bond St., London, W.1.

As General Aviation Consultants and Air Port Engineers, this company presents quite an interesting "exhibit." There is a map of the world showing the routes followed by Sir Alan Cobham on

his various pioneer flights, and another one of Africa, showing the course of the new Trans-African air route, existing and projected air routes.

In addition, there are numerous photographs—including mosaics of London and New York—models, and two suggested plans for an air port for London.

**Dunlop Rubber Co., Ltd. (32),**

Fort Dunlop, Birmingham.

Dunlop Tyres are arranged very effectively on this stand in the familiar telescopic manner. Wire wheels of the well-base type and the new alloy disc wheels being the main features of the company's exhibit. The new disc wheels are interchangeable with wire wheels and brake drums of any dimension can be provided for all types of brake equipment. A complete range of Dunlop-wired type tyres is on view, as well as a comprehensive selection of accessories such as pumps, jacks, tyre levers, pressure gauges, etc.

**Desoutter Bros., Ltd. (120),**

The Hyde, Hendon, London, N.W.9.

There is much on this Stand to interest the constructor or works manager, if not the "man-in-the-street," for here is displayed a range of pneumatic drills, pneumatic screwdrivers, pneumatic spanners, standardised die sets, and other necessary tools that assist in the construction of the aircraft such as fill the greater part of Olympia.

**Alexander Duckham & Co., Ltd. (181)**

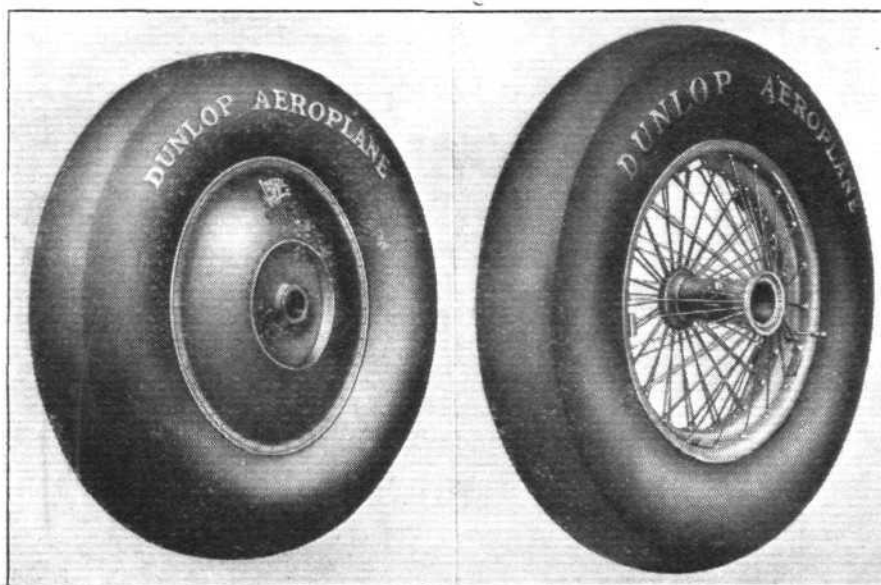
6, Broad Street Place, London.

The chief feature of this exhibit is a demonstration of passing the company's "Adco" oil through snow-covered pipes in order to reveal its fluidity under extremely low temperatures. And as "Adcol" oil is particularly recommended for Gipsy and Cirrus engines, these engines are also on the stand. Both "Adcol" oils and greases are displayed.

**Essex Fire Extinguisher Co., Ltd. (177),**

20-21, Essex Street, Strand, London.

Fire extinguishers are still necessary equipment on aircraft. On this Stand you see the Essex Fire Extinguisher No. 2 which is used by the Royal Air Force, although it is also intended for large cars, motor-boats, omnibuses, private houses, etc. No. 3



Dunlop Aero Wheels : Alloy Disc type and wire, well-base, type.



Extinguisher is for even larger outbreaks, and is to be carried on the new airships, R.101 and R.100. No. 1 type is for small cars, etc.

To pass their products for the Air Ministry, the company had to prove that their Extinguisher was light in weight, did not give off poisonous fumes, conduct electricity, or get out of order. It is hermetically sealed and the liquid cannot corrode the jet or container, so that it is always ready for instant operation. It is only necessary to use one hand, whilst no pumping is required. This company is also showing the Hancock Oxycoal-gas steel cutting and profiling machine, which cuts steel plates to any required shape or size, either by hand-guiding or automatically from a template made from strip aluminium. Another exhibit is the Power Shear for rapid cutting up of spars and other parts of aircraft.

**English Steel Corporation, Ltd. (85),**  
Vickers House, Broadway, Westminster, London, S.W.1.

On the same Stand as Vickers-Armstrongs, this firm displays some interesting aero-engine components, including an aero-crankshaft stamping weighing 16½ cwt. and measuring 10 ft. by 18 in., a motor connecting rod, 2 ft. by 6 in., and a "Duralumin" crank-case stamping 2 ft. diameter by 8 in. wide.

**Thomas Firth and Sons, Ltd. (78),**  
Norfolk Works, Sheffield.

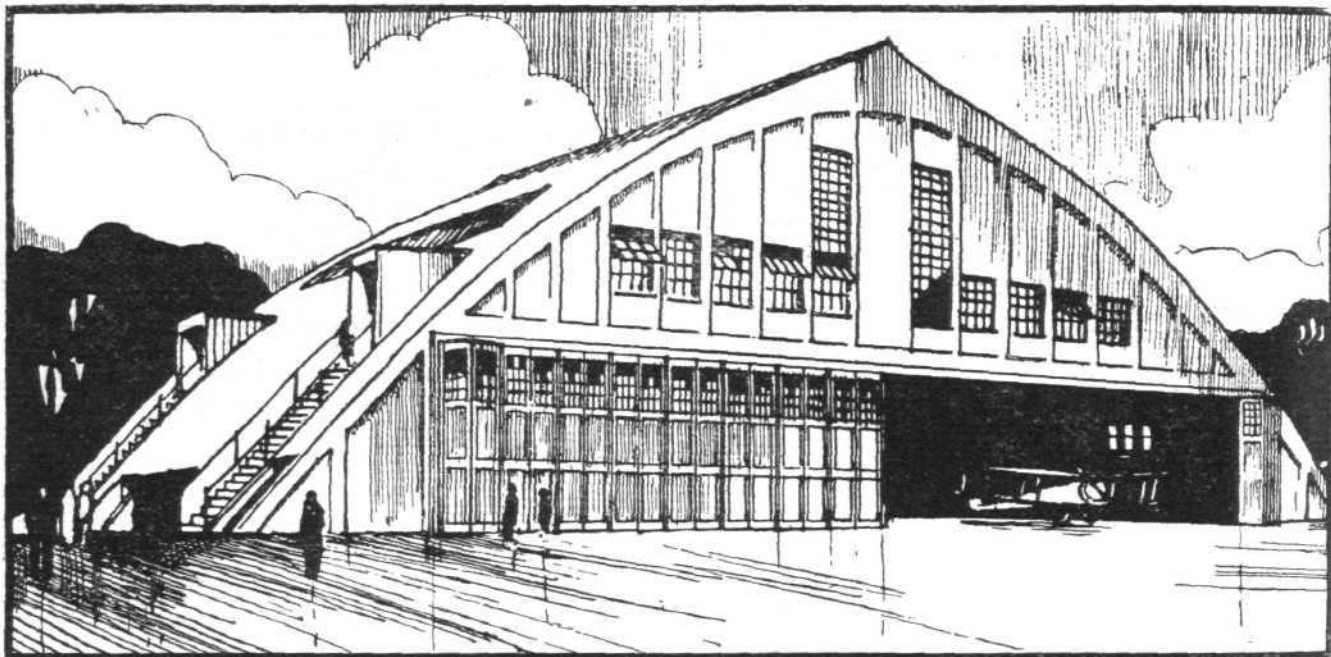
Prominent among the steel firms specialising in alloy steels for aircraft work is Thomas Firth and Sons, Ltd., who are showing a complete range of their aircraft products. There are special steels in the form of finished component parts of most of the modern British aero engines. The steels are particularly noteworthy for the promi-

for flying-boat hulls and other detailed components. Apart altogether from the Firth stand, there is throughout the Exhibition a very large number of machine and engine parts all manufactured from Firth alloy steels.

**Samuel Fox and Co., Ltd. (75a),**

Stocksbridge Works, Nr. Sheffield.

The exhibit consists of two showcases, the first containing a variety of small parts made from their wire and strip steel, with samples of material to Air Board specifications in the normal cold-worked state, as follows:—stainless steel rivet wire, half-round split pin wire, special aero valve spring wire, patent tie rods, rivet wire, wire for magneto parts, welding wire finish, stainless steel rivet wire, wire for engine gaskets, cold-worked steel as used on the Cardington airship. A feature of the display is "Firth Staybrite" steel—



Sketch of the main hangar at Heston Air Park, which is fitted with Esavian folding and sliding doors.

**Educational Supply Association, Ltd. (148),**

Esavian House, 171-181, High Holborn, London, W.C.1.

This exhibit is formed of a section of a door for a hangar, consisting of four leaves each 19 ft. high and 3 ft. wide—as many leaves as is necessary can be hinged together to cover the opening to the hangar. One has just been fitted at Heston Aerodrome, which is 100-ft. in length. The doors are fitted with a winding gear by means of which one man can open and close them, no matter how strong a gale of wind is blowing.

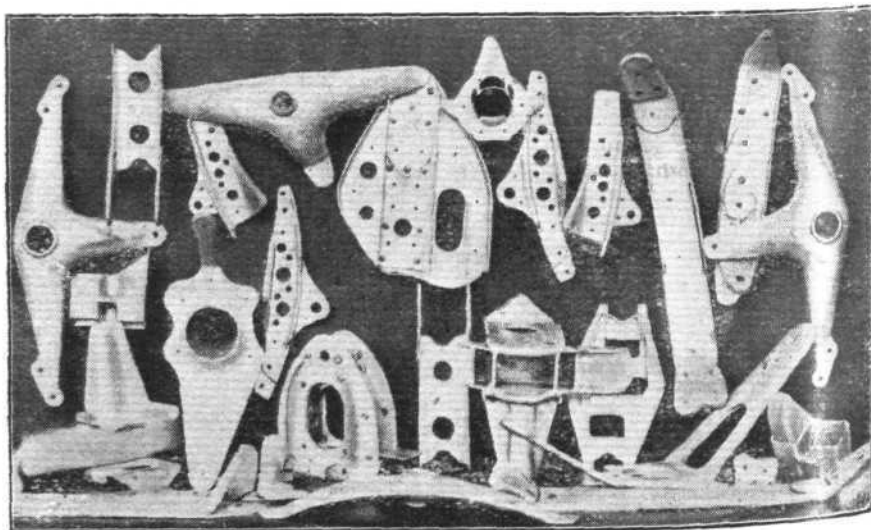
In the early part of 1918 the company were asked by the Air Ministry if they could design any doors 25-ft. high to cover openings 100 ft. in width, which could be opened and closed in all weathers without much difficulty. The Esavian principle of a sliding upright post, to which had been hinged the leaves of a folding screen, was developed and adapted, so that they were able to make doors of the required height and size. All the movements were specially designed and stays provided to prevent the doors being extended beyond a certain angle. The first doors were fitted at the Feltham Aerodrome, and within the next eighteen months, doors and fittings for doors for ten miles of openings were provided.

nent part in such international events as the Schneider Trophy Races, the non-stop flight to India by the Fairey monoplane (Napier), Sir Henry Seegrave's land-speed record and motor-boat triumphs, and Capt. Malcolm Campbell's motor records in South Africa.

Firth rust- and corrosion-resisting steels are shown to display their uses

which has proved so successful for use in the manufacture of parts subject to rapid corrosion by sea water, etc. They are specialists in the cold working of this material to wire and strip form. There are also samples of steel to the latest specifications for similar classes of work on aircraft.

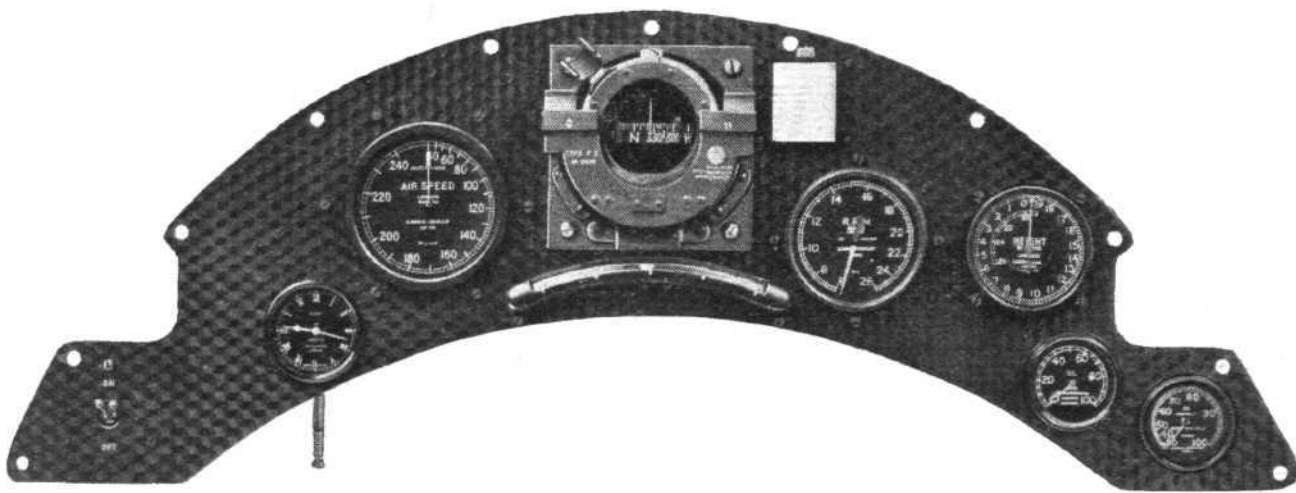
The second showcase contains small



Some specimens of aircraft parts welded up from Firth Staybrite Steel



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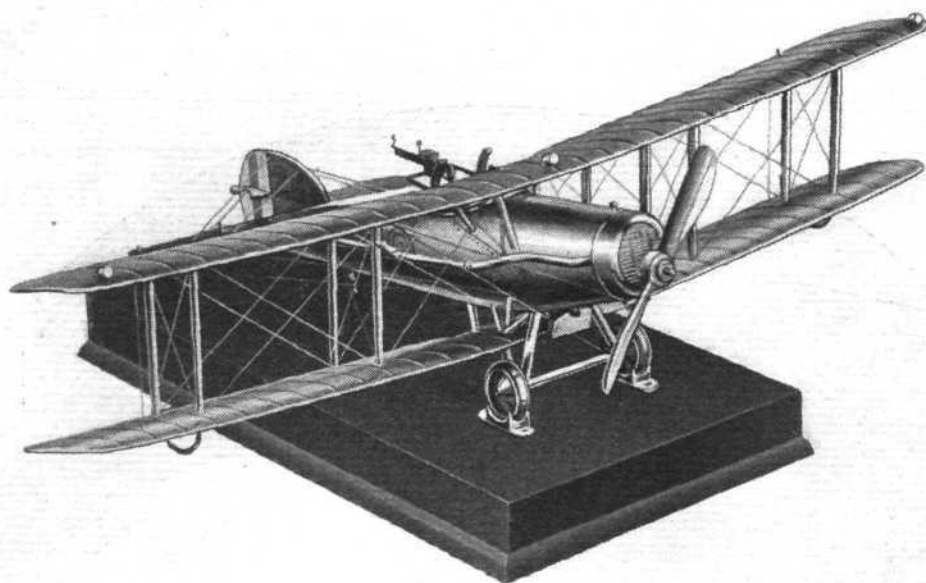
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forgings and machined parts made from material supplied by other constituent companies of U.S. companies, and full particulars may be obtained from the Publicity Manager, the United Steel Companies, Ltd., The Ickles, Sheffield.

**Glacier Metal Co., Ltd. (50),**

Ealing Road, Alperton, Wembley.

This company manufactures bearing metals and finished bearings for aircraft engines. The exhibit consists of their Findlay's Motor Metal No. 1 for metalling the bearings of aircraft engines. Also there is a full line of finished bearings, some bronze-backed lined and other steel-backed lined with Findlay metal. A complete connecting rod assembly is another product displayed.

**Gloster Aircraft Co., Ltd. (4),**

Sunningend Works, Cheltenham.

The Gloster-Straussler Fuel Pump shown here is of the direct-feed type, pumping fuel from the supply tank through a single pipe line direct into the carburettor. The quantity pumped is regulated by the needle valve of the carburettor. So long as the needle valve is open for the admission of fuel the pump delivers into the float chamber, but immediately the needle valve closes, the pump is automatically cut out. It may be driven off any reciprocating or rotating part of the engine or other mechanism, and the speed at which it is driven is immaterial, so long as the capacity of the pump at that speed is sufficient to supply the engine requirement.

It is of sufficient capacity to supply any type of engine up to the greatest power, and its weight is under 3 lbs., and over all measurements  $4\frac{1}{2}$  in. by  $5\frac{1}{2}$  in. by 6 in.

Another important exhibit is the Gloster Hele-Shaw-Beacham Variable Pitch Airscrew. It is impossible to give a detailed description of this here (incidentally, it was fully described in FLIGHT for October 11, 1928), and we can only say that it is now well past the experimental stage and is giving very satisfactory results. It may be added that this airscrew is automatic and employs a hydraulic system in its operation.

**Alfred Graham and Co., Ltd. (130),**

26, Savile Row, Regent Street, London, W.1.

This established firm of manufacturers of telephones, wireless and other apparatus, has its headquarters at Slough, Bucks, where a large modern factory is shared with the associate company, Graham Amplion, Ltd. Matters relating to aircraft equipment are under the control of Capt. D. Sinclair, late of the Air Ministry, who is an expert in civil aviation wireless.

On their Stand is aircraft radio apparatus of latest design, as well as public speech and band repeater equipment for use on the ground. It is interesting to remember that the latter is in operation during the Exhibition. It was used on the opening day to relay the speech of H.R.H. the Prince of Wales. Apparatus shown includes medium and short wave aircraft equipment, with

and without direction-finding apparatus, also a portable battery operated transmitter and receiver for lightships, survey work, etc. A feature is the Graham Light Aeroplane Equipment, which incorporates what is probably the smallest wireless set in the world for its power—and about which we shall have very much more to say in a future issue.

**J. J. Habershon and Sons, Ltd. (38),**

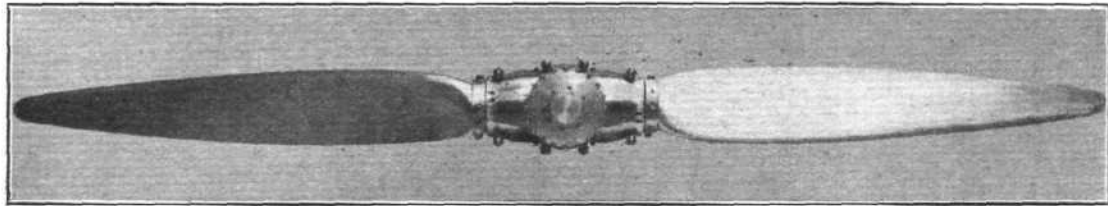
Holmes Mills, Rotherham, Yorks.

For over a hundred years J. J. Habershon and Sons, Ltd., have been established, and they are said to be the largest cold rollers in this country. They have specialised in the production of steel strip to the various aircraft specifications during the past three or four years, having supplied the whole of the strip used in the construction of the Airship R.101, and are also supplying the leading aircraft firms with strip. On their Stand aircraft steel—in various stages of production—from the ingot to the finished strip for spar and section, is seen. In detail there are the following exhibits: an ingot of steel; slab and billets; steel strip and sheets as follows: nickel-chrome steel to speci-

and electric valve refacers provide what is known as the Black and Decker method of grinding valves and cleaning carbon. Together with the latest Black and Decker device for refacing valve seatings for aero engines, it provides the zenith in accuracy.

The HF engine stand saves a great deal of manhandling of heavy engines, and simplifies maintenance. It carries the engine, transports it from place to place, and holds it in any position that suits the mechanic best. Floor cranes and hoists are also great labour savers. A constantly available service of high-pressure air is one of the most modern developments in engineering workshops. For tyre inflation it is of course essential, and the HF compressor units which are specially designed for purposes within the category of motor engineering, are shown.

The HF Hydroforce washing plant deserves special mention. This is a British made high-pressure hydraulic washer, valuable in the valeting of cars and aeroplanes. Capacities range from one to six guns, the plants being self-contained and electrically driven units designed for hard service and long life.



The Gloster-Hele-Shaw-Beacham variable pitch airscrew.

fications, stainless steel to specifications, carbon steel to specifications, rustless iron to specification; specimen spars and sections made from exhibitor's strip by various aircraft manufacturers. And not to be missed, sections of stainless tubes as used in the construction of the Airship R.101.

**Harvey Frost and Co., Ltd. (141),**

148-150, Great Portland Street, W.1.

This firm, whose trade mark, HF, has been familiar to the motor trade since the earliest days of the motoring industry, are showing a comprehensive range of servicing appliances for handling and re-conditioning engines. These include electrically-operated cylinder grinders and valve refacers, de-carbonising kits, valve lifters, portable electric drills, floor cranes and high-lifting jacks. Other exhibits are air compressors, spray painting appliances, the HF Hydroforce high-pressure washing plant, and various items of general equipment for the maintenance of aero engines and tyres.

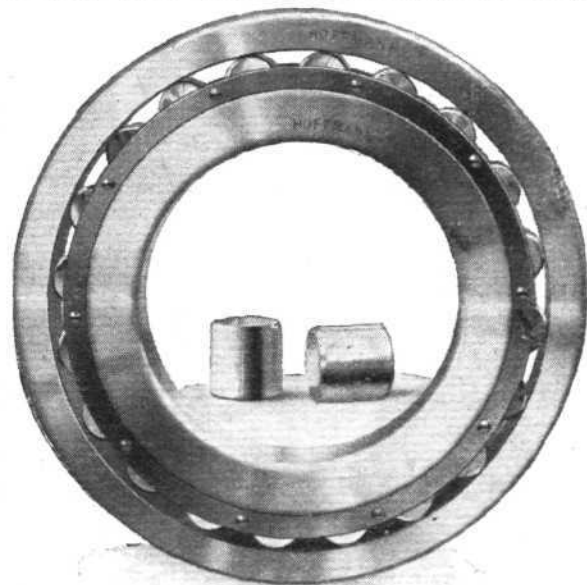
Of considerable interest are the cylinder grinders, which provide portable equipment for re-conditioning oval, scored or misaligned cylinder bores with the utmost accuracy and fine finish, also with a trifling expenditure of labour, time and skill. The de-carbonising kits

Visitors will not overlook the fact that Harvey Frost and Co. are the inventors of the HF process of tyre repairing and specialists in all types of vulcanising appliances and materials.

**The Hoffmann Mfg. Co. Ltd. (179),**

Chelmsford, Essex.

There is much unsuspected fascination in this company's wide range of manufactures, particularly for the lay mind. When the visitor looks upon the smallest steel balls ever manufactured, being



One of the many types of Hoffmann bearings as used on aero engines, the Standard Roller bearing.

$\frac{1}{32}$  in. in diameter, it should make him look incredulous when he learns that every Hoffmann ball is guaranteed to be within one 10,000th part of an inch of standard size. These little balls will be found in a small glass tube which contains 40 gross of them. And the entire representative range of Hoffmann steel balls shown are guaranteed to be quite as accurate. An interesting object on this stand is the section of the Rolls-Royce "Condor" engine reduction gear fitted with Hoffmann bearings throughout. This gear is of the same design as the gear fitted in the "Condors" on the new R.100 airship, now nearing completion at Howden in Yorkshire, and expected to make preliminary trials before long.

The Hoffmann steel balls in their various stages of manufacture are very interesting, and the same can be said of quantities of Hoffmann magneto (detachable) type ball bearings illustrating the interchangeability of the parts. Amongst the other exhibits are sets of aero engine bearings, a crankshaft of a Napier aero engine fitted with Hoffmann roller bearings, also a Napier airscrew shaft similarly fitted. A "Jaguar" radial engine crankshaft, and reduction gear for the same type of engine, are shown fitted with Hoffmann products.

The range of steel rollers shows further examples of products turned out to one 10,000th part of an inch of standard diameter, and to within two 10,000th parts of an inch on length. Finally there are Hoffmann roller gauges with N.P.L. certificate of accuracy which definitely signifies their very high standard.

**Henry Hughes and Son, Ltd. (84),**  
59, Fenchurch Street, London, E.C.3

Instruments for air pilotage in the light aeroplane and for air navigation on long-distance flights are on view,

comprising the Aperiodic compass, which returns after being displaced from its equilibrium position by one direct movement to the north pointing position, and is steady under casual to-and-fro disturbances as well as being resonant. In addition, the short light magnets are so made that the compass is by no means rendered sluggish in consequence of its aperiodic character. The dead-beat return to zero is made comparatively briskly. The Aperiodic compass was designed as far as possible to meet generally the conditions of ordinary flights, but during the last few years modifications have been adapted to meet special purposes, with very wide limits. There are now some 30 different patterns, and the exhibit comprises all the principal patterns. The following are a few compasses of special note: P.2, the latest Aperiodic pattern with shock absorber mount, and a still later design to attain a lighter and more compact instrument is the P.4; P.3, the latest design of night-flying compass; Mark III.A, of which a special exhibit is made, has been standardised for light aeroplanes; O.3 is the latest pattern of standard compass with prismatic sight; S.O.2 is for a similar purpose, but is fitted with a vertical reading, and the reading is of the centesimal scale design for aperiodicity; 253 A.C. is the standard pattern for aerial surveys, with centesimal scale.

New designs exhibited for the first time include a new patent projector compass in which a very small card is optically magnified; a similar pattern with direct reading vertical card is also shown, whilst for airships the pattern selected for R.100 is on view. Instruments for estimation of drift, instruments for determining position, and the Estimograph or combined instrument for all observations necessary for navigation are also on view.

**H. M. Hobson, Ltd. (17),**

47-55, Acton Vale, London, W.3.

Claudel-Hobson carburettors—which form the main exhibit on this Stand—have been a standard fitting on many aero engines for a considerable number of years now. They are produced in a variety of patterns, to suit all types of aero engines. The display on this Stand is particularly interesting in that some of the carburettors are shown actually fitted to various types of engines. For instance, there is an "A.V.T. 70 G." on an Armstrong-Siddeley "Jaguar" and an "A.V.T. 100" on a Siddeley "Leopard." Other types similarly shown are the "A.V.T. 70 A." (on a "Lynx"), the "48 C.R." (on a "Genet"), and the Bristol C.H. "Triplex," as fitted on the Bristol "Jupiter" engines.

They also show Hobson K-S Telegages for aircraft.

**Industrial Rubber Manufacturers, Ltd. (81),**

191-2, Tottenham Court Road, London, W.1.

Rubber products of every description, for aircraft and to Air Ministry specifications or requirements, describes the exhibit on this Stand. Amongst the numerous items on view may be mentioned the following: rubber tubing, petrol resisting, and red Pitot; petrol-resisting rubber sheeting; sponge rubber, in sheeting, tubing, cord, and matting; Turner shock-absorber cord (2 F.16) and rings; special compression shock absorbers; pyramid and fluted matting; and hose of all kinds.

**Irving Air Chute of Great Britain, Ltd. (11),**

Works Road, Letchworth, Herts.

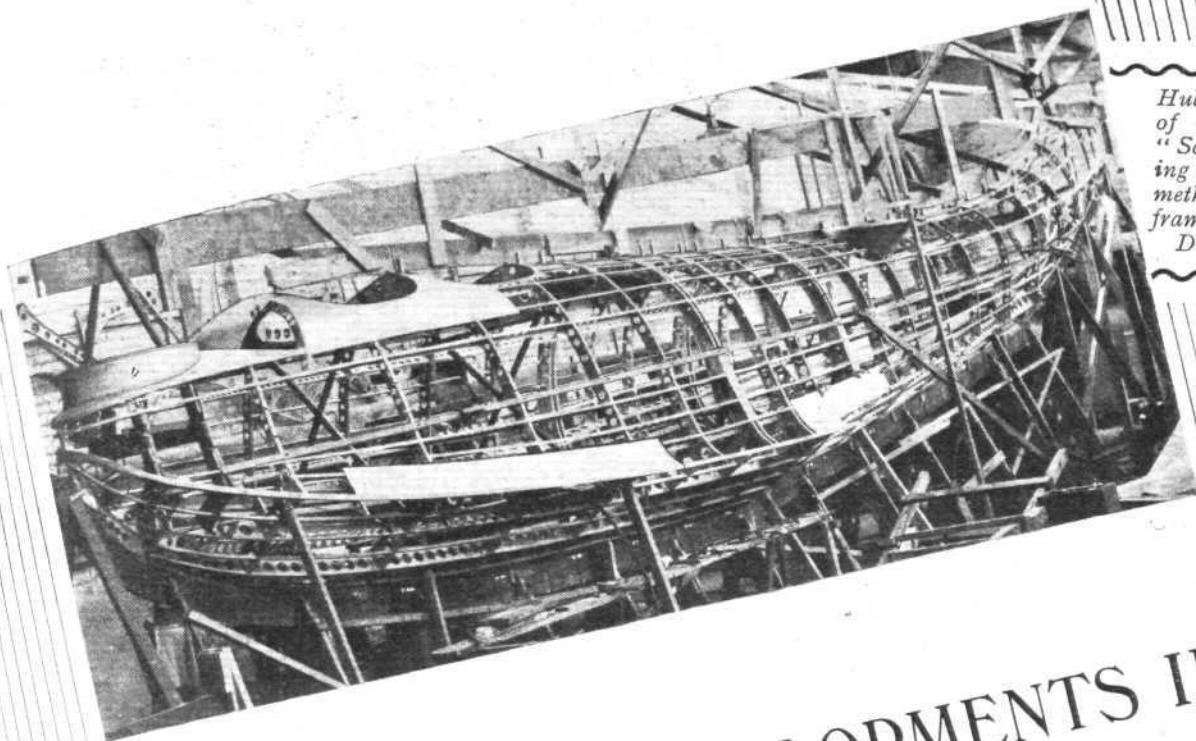
The Irvin parachute has now attained a world-wide popularity. It is standard equipment in our Royal Air Force and in the American Air Services and many other countries. In England it is



Some of the Aero instruments exhibited by Henry Hughes and Son: (1) "O.3" Observer's, (2) "P.3" Pilot's, (3) Airships, (4) "253 A.C." Pilot's, (5) "S.O.2" Aperiodic.



FL.25.7.29.



Hull in skeleton form of the Supermarine "Southampton" Flying Boat, showing method of building up frame on a deep keel of Duralumin plate.

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**Irving Air Chute of Great Britain, Ltd. (11),**

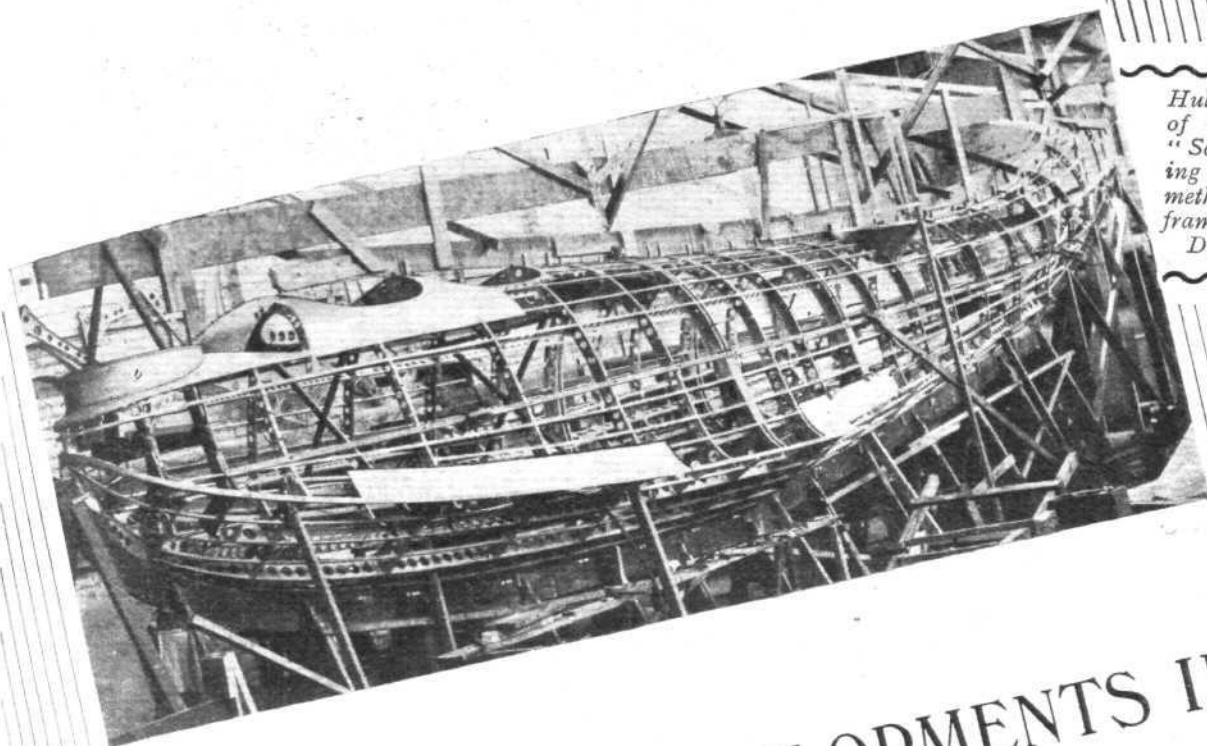
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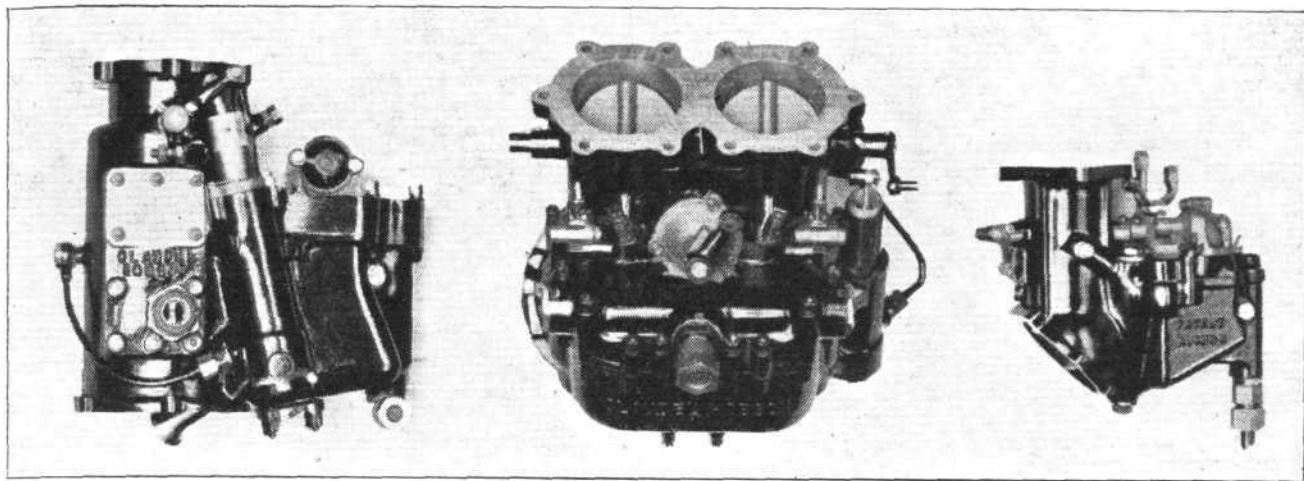
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### FOREIGN AGENTS:

FRANCE AND COLONIES: S.A. "Les Outils Pneumatiques Globe," Siege 12, rue Lavoisier, Paris (VIIIe). GERMANY: Internationale Presse-Druck, 12, rue Lavoisier, Paris (VIIIe). JAPAN: U. Elektricitats, G.m.b.H., Suderoder Strasse, Berlin-Brandenburg. KOREA AND MANCHURIA: Messrs. Mitsui & Co., Ltd., 31-33, Lime Street, London, E.C.3. SPAIN: Messrs. Lloyd Industrial, Horta, Lobenstein, via Layetana 48-A, Barcelona. AUSTRIA: Messrs. Firth Bros. Pty. Ltd., Union Bank Chambers, 351, Elizabeth Street, Melbourne, C.1. AUSTRIA, CZECHOSLOVAKIA, HUNGARY, YUGOSLAVIA, RUMANIA AND BULGARIA: Messrs. Schuchardt & Schutte, 1, Franz Josefs-Kai 7-9, Wien, Austria. HOLLAND: Messrs. P. van Den Berg, Galvanistraat 95, 'S-Gravenhage, Holland. CANADA: Messrs. Williams & Wilson, Ltd., Montreal.



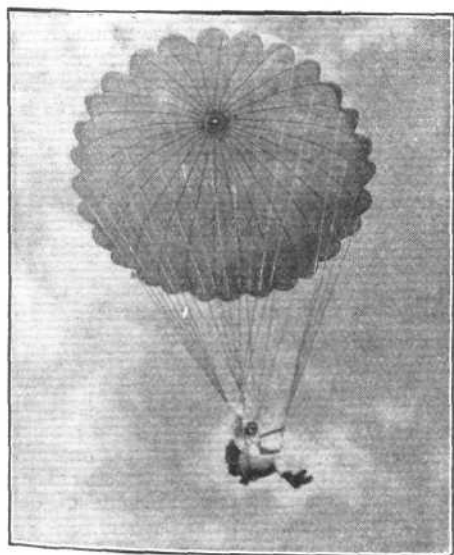


Three Claudel-Hobson Aero Carburettors : Types A.V. 70A, A.V.T. 70G, and A.V. 48C.

manufactured almost exclusively for our Air Force under the personal supervision of Mr. Leslie Irving, who is the Managing Director of the English company. On their Stand there are the following models: the ordinary seat type, most useful for pilots; the lap type for observers, and the back type, which is adaptable for lighter-than-aircraft and exhibition jumping. There is also a newly-designed parachute for observers which we recently described in FLIGHT. It is a detached type, so that it can be placed in a cockpit which happens to be very small and does not allow the observer to wear the parachute on his lap. In case of emergency, the observer can attach the pack to his harness in a

exhibit a wide range of instruments for aerial navigation. It is interesting to note that their association with aviation dates back to the days of Cody, Boyle, Gilmour, Hamel, Latham and others who fitted K.B.B. aero compasses in their primitive machines. Alcock and Brown, in the first successful non-stop transatlantic flight, June, 1919, navigated by means of special compasses supplied by K.B.B., Ltd. During the last few years enormous strides have been made in the development of navigational apparatus for ensuring the safety of those who travel by air, in addition to instruments primarily designed for naval and military purposes. Examples of such instruments may be seen on this Stand.

In regard to compass equipment, K.B.B. have maintained a steady advance in the production of new models, and they now offer a special compass for every type of aircraft, for the large airship and the light aeroplane of the private owner. For the latter, a particularly neat and efficient direct-reading compass is shown, which should appeal to the solo flier. A noteworthy exhibit in their compass section is a number of historical K.B.B. aero compasses, lent by the courtesy of the Director of the Admiralty Compass Department, which illustrate the progress made in compass design over the past 20 years. Among other classes of instruments the new Behm Echo-Altitude, as installed in the Graf Zeppelin, is shown and demonstrated.



The Irvin Air Chute. This shows the correct, comfortable, position of sitting in the harness.

second by hooking on at two places. Should only one hook be attached, the parachute will function just as rapidly and safely, the only difference being that as the observer is suspended at one point, he has not quite the same control over his descent. But that is a negligible point. Incidentally, Mr. Irving is a pilot and private owner of many years' experience. He has owned many types of British and American aircraft.

Kelvin, Bottomley and Baird, Ltd.  
(154).

18, Cambridge Street, Glasgow.  
These exhibitors—who carry on the traditions of its founder, Lord Kelvin—



The Kelvin Aero Compass.

It solves one of the most difficult problems in aerial navigation, which is to determine altitude accurately, a matter of supreme importance to the pilot when cruising at night, flying in mist or landing in foggy weather. Another apparatus exhibited here is the Aviation loudspeaking electro-megaphone.

K.L.G. Sparking Plugs, Ltd. (157),  
Robinhood Engineering Works,  
Putney Vale, London, S.W.15.

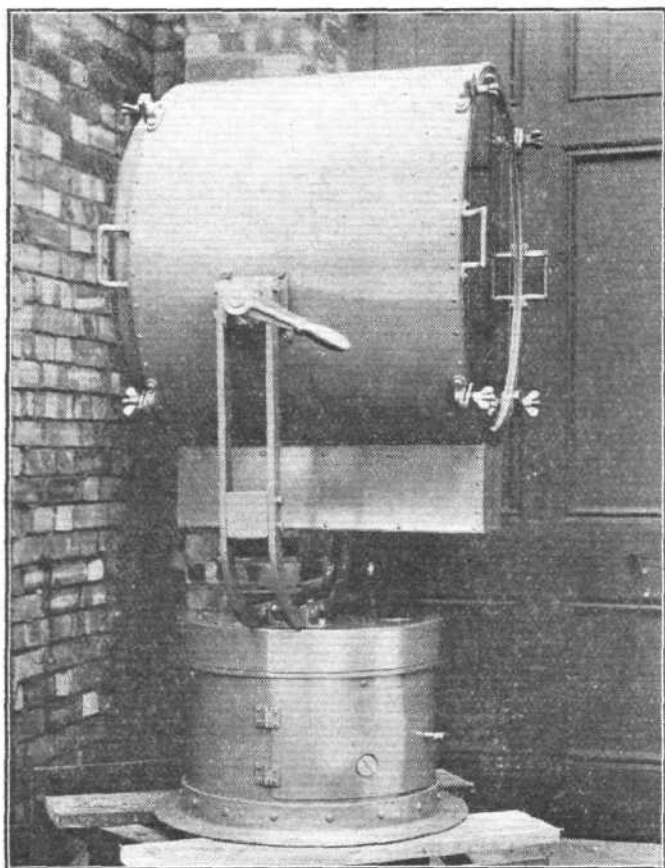
There have been few of the big aviation events and record flights in the history of flying in which K.L.G. plugs have not figured. It would be hopeless to enumerate all these—even if we had the space!—but we would point out that in each case K.L.G. plugs were remarkable for their consistency and efficiency. "Throughout the flight we did not have to change the plugs" has been a common statement at the conclusion of some big event.

On this Stand will be seen a range of the different models which have been designed to meet the varying requirements of all classes of aero engine—a matter to which this firm has devoted considerable attention and research.

The London Electric Firm (116),  
South Croydon, Surrey.

One of the most important items in the illumination equipment of an aerodrome is the lighting apparatus for night landings. This has been effected in many different ways in the past, and the most modern method is to employ a large dioptric floodlight to illuminate the ground through an angle of 180°. The floodlight has to be portable as it must be placed on the aerodrome so that it not only indicates the direction in which the machine must land, but illuminates the landing area as well. A modern floodlight is amongst the exhibits here. The firm specialise in illumination gear for aircraft. They also show boundary lights, ceiling projectors, signalling projectors, the Neon Beacon, and obstruction lights for revealing buildings or other obstructions near an aerodrome.

The Neon Beacon has considerable penetrating



**The Revolving Beacon for Aerodrome lighting made by the London Electric Firm.**

power in foggy weather. Route beacons are also shown on this Stand. Electric beacons are mostly used on main air routes, but in remote positions acetylene and a form of clockwork can be adapted.

**Lodge Plugs, Limited (18),**  
Rugby.

The sole product of this company's specially-equipped factory at Rugby is Lodge sparking plugs for internal-combustion engines. During the war they were exclusively engaged on special designs of aircraft plugs for the British and Allied Governments, and their present world-known plugs are largely a result of that experience. Many types of these plugs are exhibited, and those visitors who fly or are connected with aircraft at all will like to know that Lodge Plugs, Ltd., are presenting their little neat key ring gauges to those who make a visit to their Stand. It is very important to maintain accurate set plug gaps, and to assist mechanics



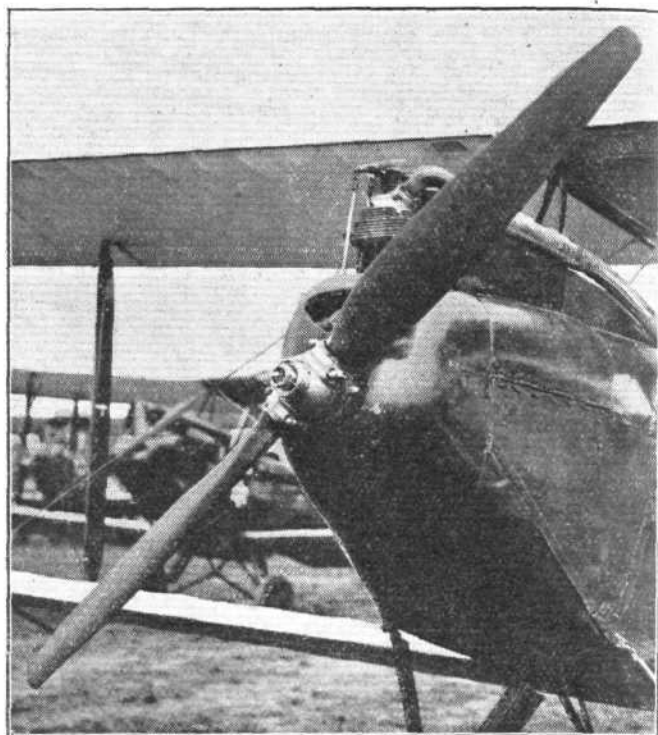
**The Lodge "A 20" plug, showing compressed steel collar, which ensures permanent gas-tightness.**

key ring. They are worth obtaining. Lodge aero plugs are based upon the designs favoured by the Air Ministry, mica being used for insulation, and the metal parts are of steel rendered rustless by a zinc coating. Their models A.20 and A.21 are suitable for medium compression water-cooled engines, such as the Napier "Lion," Rolls-Royce "Condor," the "Liberty" and "Eagle." With the exception of the length of reach, these models are identical, whilst the centres are interchangeable. Models A.40 and A.41 are used for high-compression water-cooled and air-cooled engines working under exceptionally strenuous conditions. Then there are models A.30 and A.31, later developments to A.20 and A.21, whilst Lodge plugs are also specially produced for supercharged and racing engines. Additional types are A.50, A.51, A.53, A.54, A.55 and A.56.

**Metal Propellers, Ltd. (9),**  
Purley Way, Croydon.

Here is a complete range of metal blades and hubs constructed at the Croydon works under the Leitner-Watts patents. The principle of construction of this blade is that it is made from laminated sheet-steel pressings, the halves of the blade being welded together. Their steel airscrews possess the features of detachability of blades, making for ease of transport and replacement in case of damage. Large numbers of these propellers are in use by the R.A.F. This type was fitted to the Supermarine "Southampton" flying-boats on their R.A.F. Far East cruise.

A new departure now shown for the first time is a metal airscrew of the Leitner-Watts type produced for the light aeroplane market. This weighs less than the solid alloy metal airscrew and possesses all the advantages of its



**A Leitner-Watts Metal airscrew (fitted on a D.H. "Moth") manufactured by Metal Propellers, Ltd.**

in doing this, the company has made up sets of limit gauges mounted on a

larger prototypes. Developments have resulted in its production for the "Cirrus" engines. Meanwhile, a further stage is to be attained by the production of a similar model for the "Gipsy" engine.

The range of blades exhibited ranges from the small "Cirrus" propeller of 6 ft. 6 in. diameter up to blades for a 16-ft. diameter airscrew, such as will be used in the new Government airship, which will shortly be making its first flight.

Other samples on view are high-class aircraft components, such as metal spars, wing ribs and aileron ribs, together with other articles in Staybrite steel, manufactured at their Purley Way works.

**Marconi Wireless Telegraph Co., Ltd. (29),**

Marconi House, Strand, W.C.2.

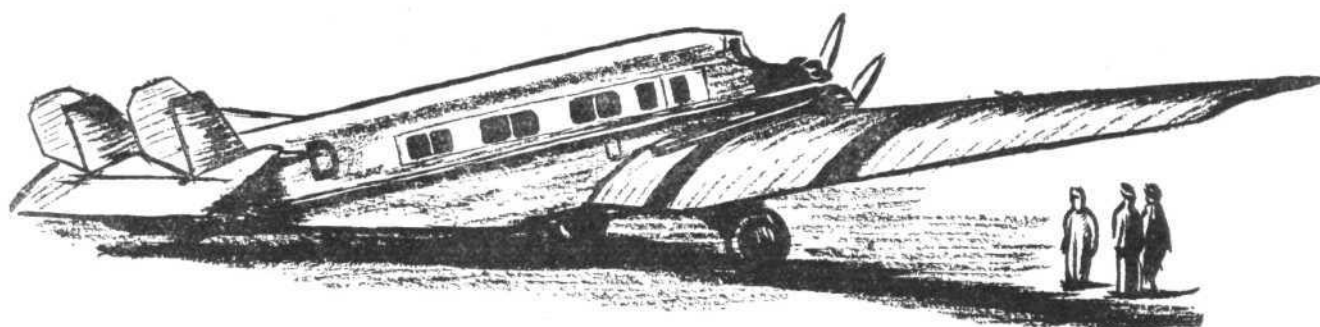
Amidst the extensive range of Marconi wireless apparatus—specially designed for various types of aircraft and ground aerodrome stations—there is one set which should attract the wireless enthusiast, particularly if he be one of the large number of private owners.

And that is the new telephonic model A.D.22, which we described fully in FLIGHT, July 18. It has been designed for the light 'plane, and it admirably fulfils its purpose. The limitations of the size of the light 'plane cockpit has previously been a difficulty for the wireless designer, for it has imposed upon a set both light weight and limitations in size.

The A.D.22 is about as small and light as a suitable aircraft set could be. It is only 16 in. x 9 in. x 7 in. and weighs with all its accessories, only 60 lbs. Yet it has a receiving range of over 100 miles and a transmitting range of about 70 miles.

One can easily anticipate an overcrowding of the ether on aircraft wave-lengths by the transmitting by private owners. Beyond this, other types are open for inspection, but

# LUFT HANSA



*A Luft Hansa Junkers G31, 12-passenger monoplane.*

Day after day the magnificent air liners of the Luft Hansa leave Croydon for Hamburg and Berlin. Every one of these great German aeroplanes leaving Croydon—as reliable and regular as an express train service—is fuelled exclusively by SHELL.

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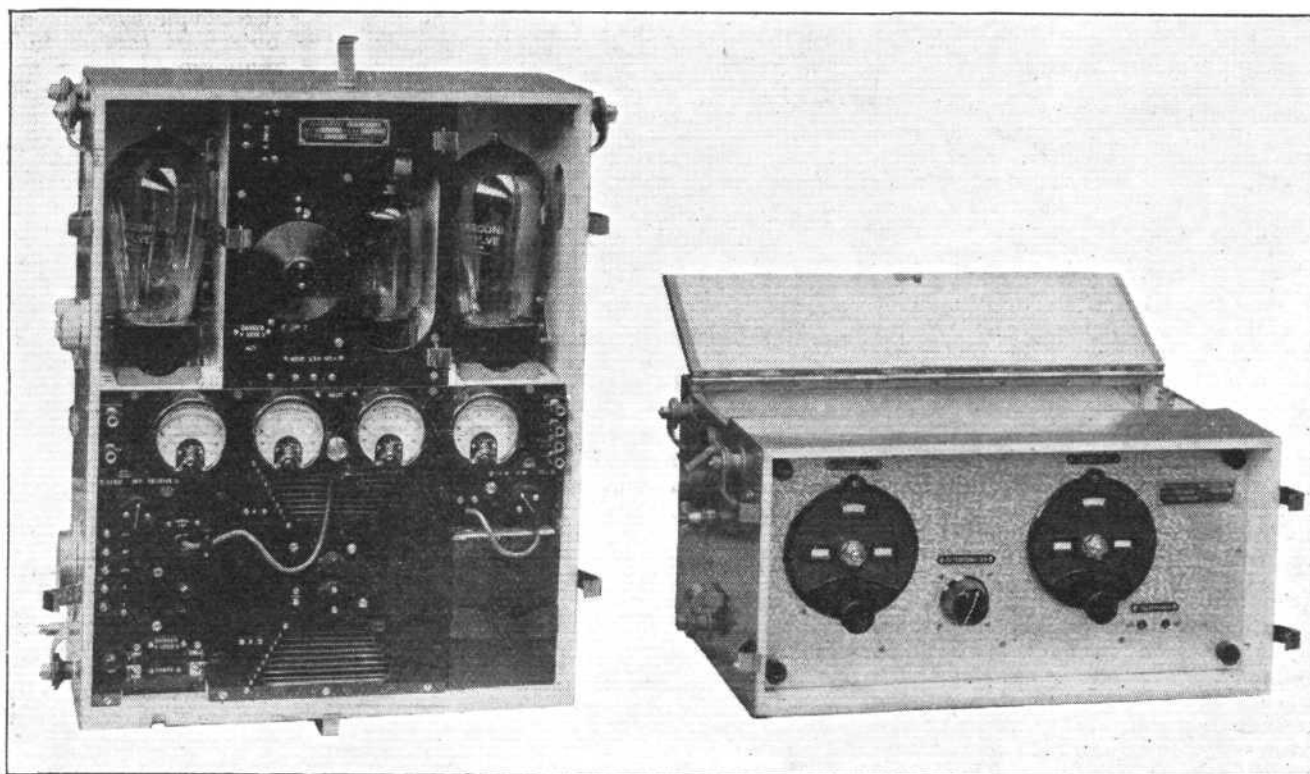


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Kindly mention "Flight" when corresponding with advertisers.



Marconi Wireless Sets for Aircraft. The "A.D.19" Short-wave telegraph and telephone transmitter and the "A.D.20" short-wave receiver.

within the space available for this description it is not possible to mention in detail all the helpful types on the Stand.

One should, however, specially note the type—as used at Croydon—on the Civil Aviation Wireless Services Section of the Air Ministry exhibits. On the Marconi Stand itself are direction-finders, beacon transmitters, general purpose receivers, and the larger apparatus for aircraft, suitable both for telegraphy and telephony.

Incidentally, there are several pieces of Marconi apparatus of historic interest, amongst them being the apparatus used to such effective purpose by Capt. F. T. Courtney when he forced-landed in the Atlantic in his Dornier flying-boat last year.

**E. B. Meyrowitz, Ltd. (66),**  
1A, Old Bond Street, London, W. 1.

Luxor goggles have special recommendations for aviation purposes which are proved by the number of prominent pilots who have chosen them for special flights.

Improvements in the Luxor goggles which have brought them to their present high standard have often been suggested by pilots themselves. The manufacturers, E. B. Meyrowitz, Ltd., produce several styles, all of which

are on view. The lenses, many of which are non-shatterable, give wide and unobstructed vision without distortion. They have an adjustable bridge for accurate fitting to any size or shape of face.

A ventilator system deflects air currents from the eye, yet permits air ventilation inside to prevent steaming. The Luxor is strong but light. Plain lenses are easily replaced for tinted lenses and quite securely locked. Model No. 7 costs 45/-; No. 6, 35/-; and with curved, non-shatterable lenses 85/-; No. 4, 40/- (with flat, non-shatterable lenses). On the company's Stand is a large photographic group of airmen who wear Luxor goggles.

**Midland Motor Cylinder Co., Ltd. (155).**

Dartmouth Road Foundries,  
Smethwick, Staffs.

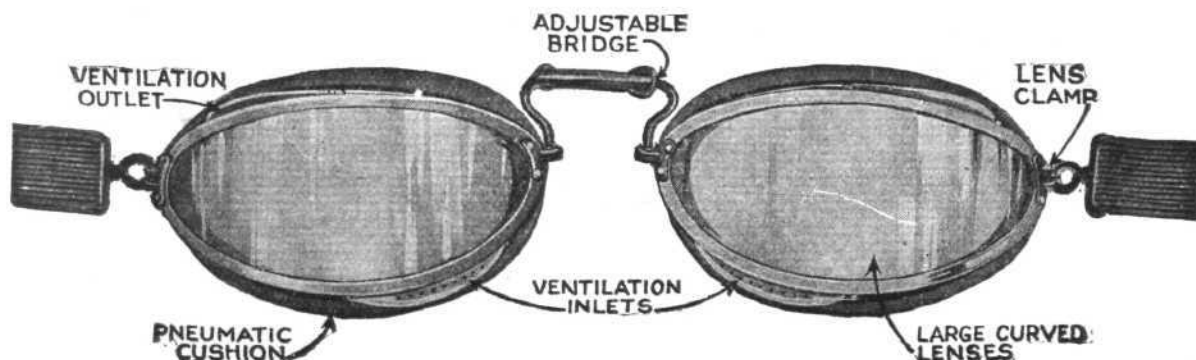
These exhibitors and the Birmingham Aluminium Casting Co., Ltd., are associated companies, and are showing as the "Birmid" Works, incorporating the two. There is a full range of castings for all types of aircraft, both in their special aero engine cylinder iron and also in all alloys suitable for this class of work, amongst others being a full range of all castings used on the "Cirrus-Hermes" engine, castings for the "Cirrus" Mark

III, De Havilland cylinders, Napier "Lion" head castings, Armstrong-Siddeley "Jaguar" heads and "Jaguar-Streamline" heads and crankcases. In fact, the exhibit is a fairly representative collection of castings as used in the industry to-day. It must, of course, be understood that the whole of the castings are in a unmachined state, the works not being laid out for the undertaking of machine shop work.

**Mono Spar Co., Ltd. (121),**  
4, Broad Street Place, London, E.C.2.

The Stieger-Mono-Spar wing construction forms the subject of the exhibit on this Stand. This is shown by a test wing section manufactured for the Air Ministry by W. Beardmore Ltd. for the purposes of trying out the principles of this form of construction. A model of a complete monoplane wing, 2 ft. 6 in. by 2 ft. 6 in. is also on view, which shows the latest method of construction, whilst another model of a single spar strengthened in torsion by pyramid bracing shows the actual principle employed.

We need not dwell further here on this firm's interesting exhibit, as the reader will find some additional information concerning the Stieger-Mono-Spar on page 796 of this issue.



One example of the various models of "Luxor" goggles shown by E. B. Meyrowitz, Ltd.

**Frederick Mountford (Birmingham) Ltd. (135),**  
Fremo Works, Mosely Street, Birmingham.

Their manufactures comprise all the standard A.G.S. parts for aircraft, made from mild steel, stainless steel, high tensile or carbon steel, duralumin, brass or copper. These include all turned parts such as bright bolts, bright nuts, eyebolts, bright studs, solid and split taper pins, fork joints, metal thread screws, to mention a few, and pressings such as thimbles in brass or stainless steel, dural washers, shackles, etc. Wire goods include mild steel split cotter pins, stainless steel split cotter pins, locking wires, spring washers. The company undertake any special turned parts or pressings which are not included in their standard list.

**Nationale Benzole Co., Ltd. (6),**  
Wellington House, Buckingham Gate, S.W.1.

Aerodrome installations for the storage of National Benzole Mixture and various working models are on view. There are many advantages claimed for this fuel in connection with aircraft, the chief amongst which is the claim that it allows more flying miles to the amount of fuel carried. Complete information is available relating to this spirit for aeronautical purposes.

There is also a highly interesting illustration of the Benzole in its different stages as it is abstracted from coal. From coal it arrives as wash oil, then becomes crude Benzole, motor Benzole, and finally the National Benzole mixture.

**National Flying Services, Ltd. (75),**  
Grand Buildings, Trafalgar Square.

A large coloured canvas reproduction of Hanworth Air Park is the effective scene at this exhibit which is mainly an information bureau for prospective flying pupils and private owners for whom N.F.S. will especially cater. The company is interested in the sale of any type of aircraft. Prices to purchasers will be at the same level as the manufacturers' prices, but N.F.S. clients will have first claims upon the N.F.S. workshops and general maintenance facilities.

**Nobel Chemical Finishes, Ltd. (44),**  
Slough, Bucks.

As far as possible, Nobel Chemical Finishes, Ltd., are showing examples of their finishes on actual aeroplane parts. For instance, there are metal instruments, propellers, portions of fabric, duralumin and aluminium, also engine cowls and radiators, etc., all finished in the materials which this firm has specially produced for these purposes.

Of particular interest are the Nobel Doping Schemes and the "Belco" enamels for use on all-metal aircraft. One exhibit displays a doping scheme which has been used on the new airship, R.100. Their Stand shows not only cellulose finishes but a number of oil and stoving finishes, etc., which often offer an alternative method of finishing to cellulose.

**North and Sons, Ltd. (82),**  
Whippendell Road, Watford.

A full range of Watford magnetos suitable for aircraft engines of four, five, six, nine and 12 cylinders, including the model T.4.4-1, giving two simultaneous sparks at each interruption of the primary circuit, are exhibited. Magnetos are also shown which are similar

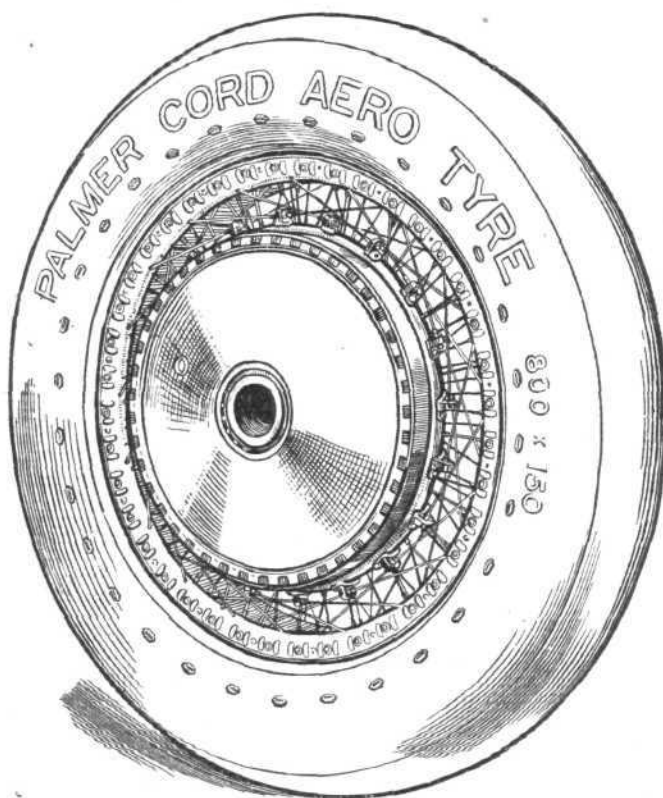
to those fitted to the Rolls-Royce engines used on the first flight across the Atlantic and the first flight to Australia. Others are similar to those fitted to the Napier engines used on the S.5 machine which won the 1927 Schneider Trophy race. In addition to magnetos there are revolution indicators for aircraft engines.

**The Palmer Tyre, Ltd. (45),**  
100-106, Cannon Street, London.

Here the visitor will see a complete range of Palmer landing wheels and tyres designed for various types of aircraft. The new Palmer Aircraft Brake is an exhibit of particular interest, as air brakes have long been recognised as necessary. The Palmer brake, which is very light, is of the fluid pressure type, consisting of an annular expansion chamber to which is attached a complete

of which can be bye-passed as required. The object of this is to ensure that the minimum of power is required to drive the blower at full speed on the ground, whereas the fullest use of the supercharger can be made at altitude. This blower will furnish sufficient air for the requirements of the largest aero engine in use at the present moment at a maximum pressure of approximately two atmospheres. It is readily adaptable to be designed as part of the crank-case or it can be mounted separately.

The company possesses several well-equipped test plants, whilst the services of a Research Department are at the disposal of clients for the investigation of special problems. Blowers are supplied with a guaranteed performance and constructed to A.I.D. requirements.



The Palmer Cord Aero Tyre and Wheel, with brake.

ring of brake blocks. When the brake is in operation the blocks are forced into contact with the inner side of the brake drum.

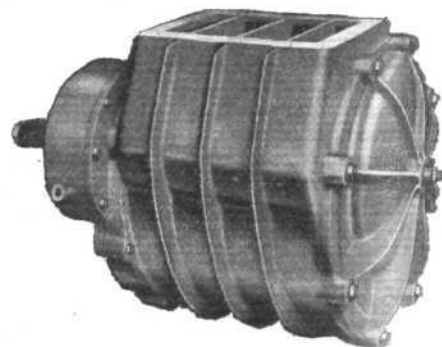
The pressure required for even considerable effect is small, owing to the fact that there is nearly 100 per cent. contact between the brake blocks and the drum. As the pressure exerted is uniform over the whole area, the drum itself can be much lighter than is normally employed when used in conjunction with the ordinary shoe brake.

A distinctive feature of the Palmer brake when it is air operated is the foot-control relay valve, by which the braking pressure can be perfectly controlled. Also the application or release of the brake can be made just as gradual as desired. That assists a pilot when steering his machine on the aerodrome.

**Powerplus (1927), Ltd. (3),**

329, High Holborn, London, W.C.1.  
The function of Powerplus (1927), Ltd., is to produce a high-speed displacement blower, the total output

**The Pyrene Co., Ltd. (167),**  
9, Grosvenor Gardens, London.



The High-Speed "Powerplus" Blower for large supercharged aero engines.

This range of fire-fighting equipment includes protection devices against fire in aeroplanes, airships and aerodromes. There is the latest improved model "Pyrene" fire extinguisher for aircraft. This machine instantly projects a powerful, continuous jet of fire-fighting



fluid in any required direction. It operates effectively at any angle.

The special fluid contained in it remains in good condition indefinitely. It will not freeze. It contains neither acid, alkali salts nor moisture. Fires can be quelled with it when water would be useless, by the formation of a dense vapour which blankets the flames. The company's "Phomene" fire extinguisher is of the foam type with recommendations as a first-aid protection for hangar and fuel stores. It is of 2 gallons capacity but generates about 16 gallons of foam, and operates upon being turned upside down as a jet of fire-smothering foam is quickly evicted. The foam floats over the surface of burning oil,

has already started, and New York has already planned to have the largest combined seaplane and aeroplane port in the world.

Propaganda in the interests of airports is to be encouraged, and the Redline Motor Spirit Co. have done a service in making it a feature of their Stand.

**Reynolds Tube Co., Ltd. (163),**

Hay Hall Works, Tyseley, Birmingham.

With metal construction for aircraft making rapid progress today—and much in evidence at Olympia—the exhibit on this Stand is not without interest. It consists of tubing, in almost every conceivable form, suitable for aircraft

door gear, and "Fast Grip" parallel vices, etc. This company are the steel work constructors at Heston Air Park.

**Rotherham and Sons, Ltd. (144),**  
Coventry.

This firm, which has been supplying components and fittings to the aircraft industry for many years now, exhibits a very comprehensive range of products, such as petrol fillers and strainers, filters, unions, etc. They have a great variety of nuts, lock-nuts, plugs, all-metal connections, and A.G.S. flanges.

They also show the R. & S. patent mechanical air pump—a very efficient apparatus driven by an air propeller. A feature of all Rotherham specialties, apart from their excellent workmanship, is the fine limit and precision work in their production.

**Rubery, Owen and Co. (5),**  
Darlaston, South Staffs.

Aeroplane accessories and components are manufactured by this well-known and long-established company for the entire aircraft industry. In scores of outstanding flights Rubery, Owen accessories have played an important share. Neatly arranged on their Stand are representative specimens, all of excellent workmanship. They include bolts, nuts, turnbuckles, eyebolts, shackles, pins, washers, fork joints, streamline wires—all A.G.S. parts. Firth's Staybrite to specifications D.T.D. 43H and Bright Steel Bar are also in the exhibit.

**Llewellyn Ryland, Ltd. (69),**

Ballsall Heath Works, Birmingham.

"Rylard" varnish, which forms the subject of this exhibit, was first produced by this company in 1913, and after many exhaustive tests in various parts of the world under various conditions it proved itself as a waterproof and weather resisting varnish. It was not until the outbreak of the war, when the British Air Ministry were looking for a suitable protective covering for aircraft, that the "Rylard" came into its own. The whole output of "Rylard" was then taken by the Air Ministry.

Its rapid drying qualities enabled the production of aircraft to be speeded-up, and the hardness of the film permitted the safe handling of machines and parts in the minimum time.

After the war, when commercial aviation was established, "Rylard" continued to hold its position, particularly with the advent of the all-metal plane, because it was already a protective coating for Duralumin hulls and floats.



The "Pyrene" Fire Extinguisher for aircraft.

petrol or other inflammable liquids and blankets the flames. Being fire-resisting, "Phomene" foam also offers protection for areas surrounding an outbreak. Those who are faced with extensive petrol or oil fire risks should see the range of "Phomene" foam fire engines on the Stand. They act on the same principle as the hand extinguisher, but are of 10 gallon or 34 gallon capacity. The 2-gallon "Conquest" soda-acid type fire extinguisher, which is also shown, affords fire protection for all the more ordinary fire risks of aerodrome buildings. Hose and general fire appliances for dealing with large outbreaks complete this exhibit.

**Ransome and Marles Bearing Co., Ltd. (40),**

Newark-on-Trent.

To those who are interested in any form of bearing in which it is essential that friction shall be at a minimum, the exhibits on this Stand are interesting.

Amongst the exhibits shown on the Stand are steel balls and rollers guaranteed to a very fine accuracy and a comprehensive range of single row, double row, self-aligning, and roller journal bearings. Special displays are made of ball bearings suitable for very high speeds, and also Duplex double-purpose bearings.

**The Redline Motor Spirit Co., Ltd. (39),**

Waterloo House, 16, Charles Street, Haymarket, London, S.W.1.

Pumps for bulk storage suitable for use at aerodromes, also lay-outs of air ports, together with models, are amongst the features on this Stand, presented by this well-known company. The layouts of the airports include an actual model, which has seaplane facilities as well as land-machine facilities. Fuel installations are shown as laid neatly below the edge of the aerodrome tarmac, whilst for the seaplanes there are fuel boats waiting in the harbour. It is a suggested idea for a future airport and it is quite practical. We shall, without doubt, see airports on these lines materialise within a few years. America

construction to all British Air Ministry and other specifications. Some examples of tubes manipulated by bending, bulging, reducing, tapering, slotting, flanging, etc., shown on this Stand are really wonderful pieces of work—and seem to indicate that this firm can do anything they like with a steel tube!

**Ripon Steel Co., Ltd. (114),**

Ripon.

Scale models illustrate "Omega" patent design of buildings suitable for aero hangars and all buildings requiring large clear spans. The distinctive feature of this design is the use of iron sheet arches for the central portion of the span. The arch comprising two-thirds of the roof covering enables the remaining one-third to be distributed at each side of the arch in the form of a slope, which can be made of roof lights or straight sheets. The "Omega" design can be adopted in various forms and thus gives a large selection for aerodrome buildings.

The models show standard steel frame buildings of the pitched roof type suitable for lock-up hangars, with the span ranging from 41 ft. to 8 ft. 6 ins., the "Frontside" sliding

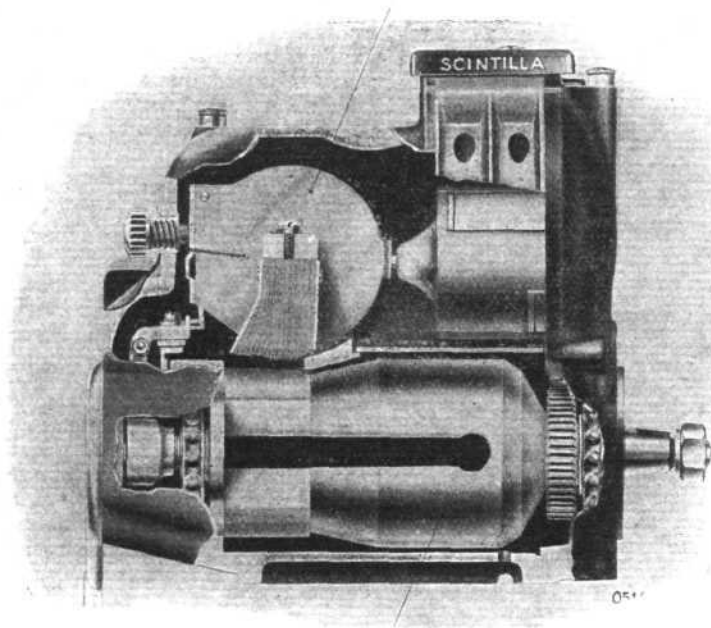


Hangar constructed by Ripon Steel Co., Ltd., for the Singapore Flying Club.

**Scintilla, Ltd. (46),**  
14, Clerkenwell Close, London,  
E.C.1.

In the United States the Scintilla magneto has been adopted as a standard type by the American Government and by a large number of aircraft manufacturers. It has been used in many successful transatlantic and trans-Pacific flights, including those by Lindbergh, Chamberlin, Byrd, Costes, Sir Hubert Wilkins and Sqd.-Ldr. Kings-

and liquid oxygen breathing apparatus for airmen, marine life-saving belts also for airmen, pressure gauges for aircraft, cockpit paddings for aeroplanes, photographic equipment accessories, instrument testing apparatus, air speed indicators, vacuum and pressure chambers for instrument testing, liquid oxygen containers, oxygen pressure pumps for filling oxygen cylinders, fire extinguishers, first-aid outfits and collapsible dinghies.



A sectional view of the Scintilla Aircraft Magneto (Rotating magnet), type GN8-D.

ford-Smith. The engines of both the "Question-Mark" and the "Fortworth," which achieved the recent record endurance flights, were fitted with Scintilla magnetos. The latest endurance record of over 10 days set up in America was another triumph for them.

A Scintilla Coupling is of very interesting design. Its timing adjustment is obtained by means of a screw and worm, so that it is possible for the timing to be altered without removing or slipping back the magneto. An aircraft hand-starting magneto is also used in conjunction with the Scintilla aircraft magneto. A special exhibit is their 18-cylinder magneto in section. A distinctly interesting Stand.

**Shell-Mex, Ltd. (10),**

Shell Corner, Kingsway, W.C.2.

This Stand is exceptionally attractive. Its style is actually the chief feature for compelling attention to Shell fuel—if that is really necessary. There is a 15-minute cinematograph show depicting the advance of aviation from its earliest stages, which is quite an entertainment in itself. A diagrammatic map of record flights on "Shell," with the scale models of the aeroplanes which engaged in the historic achievements, is an educating detail. The company is also distributing a very interesting book entitled "Your Aeroplane," each article of which is the work of an aviation authority.

**Siebe, Gorman and Co., Ltd. (48),**

187, Westminster Bridge Road,  
London, S.E.1.

The apparatus exhibited by these specialists is as follows:—Compressed

**Silvertown Lubricants, Ltd. (175),**

Minoco Wharf, West Silvertown,  
E.16.

This company commenced research on the use of mineral oils for aero-engine lubrication in 1918. At that time the use of pure mineral oil was viewed with natural suspicion. The Air Ministry carried out engine tests over a long term of years, and have now decided that mineral oils of the right type are satisfactory for use in the modern British aero engine. They have drawn up a specification covering the oils which are found to be satisfactory. Silvertown Lubricants, Ltd., have standardised a type of oil under the name of "Silvertown" Aero-engine oil, which meets the British Air Ministry Specification in every respect. They claim to be the first oil firm to have the honour of being placed on the approved list, and for many years have supplied the Air Ministry with hundreds of tons of "Silvertown" Aero-engine oil under their own certificate of quality, which is generally accepted throughout the industry. Their exhibits comprise a complete range of lubricating oils, particularly "Silvertown" aero-engine oil and "Speedolene" motor oils. This range of motor oils is based on the research work they have done on aircraft oils, and motor users have the satisfaction of knowing that when using "Speedolene" they are using a product which has been standardised for highly stressed British internal-combustion engines.

On the inner side of the Stand are examples of engine pistons which have run on "Silvertown" aero-engine oil, showing the freedom from gumming.

**Simms Motor Units, Ltd. (124),**

Percy Buildings, Gresse St.,  
Rathbone Place, W.1.

There is here an exhibition of aircraft magnetos, patent petrol gauges, patent Vortex air cleaners, patent magnetic oil filters, and patent Vernier couplings for aero work, all manufactured by Simms Motor Units, Ltd., who have branches in most large towns in Great Britain and in the capitals of many foreign and Dominion countries.

**Skefko Ball Bearing Co., Ltd. (159),**

Luton, Beds.

These exhibits consist of typical sizes and types of S.K.F. ball and roller bearings as used in aircraft construction, and are supported by a representative range of pictures of aero engines and other parts, manufactured in all countries of the world, which incorporate S.K.F. bearings—and these are many.

**E. Stanford, Ltd. (198),**

12, Long Acre, London, W.C.2.

The flying maps made by this well-known map company, who are cartographers to the King, are specially treated by a process which not only makes them more durable but renders the surface impervious to rain (and oil—so necessary when flying long distances).

The maps may be written upon with ink or grease pencils, and afterwards rubbed clean with the finger or a damp cloth an indefinite number of times. Their special maps, with others on view at their Stand, have been supplied for many great flights. The exhibits cover a range of maps for flying purposes on routes all over the world. An Ordnance Survey four-miles-to-an-inch (Civil Air edition) map and the 10-miles-to-an-inch aviation map of England, on view, are treated with their special "Lutra" waterproofing process.

**Specialloid, Ltd. (8),**

Friern Park, North Finchley, N.12.

Here is a comprehensive range of Specialloid low-expansion aluminium-alloy aero-engine pistons, showing registered construction of eight internal ribs, so arranged as to provide not only the maximum strength to the head, but also support to the skirt and gudgeon-pin bosses in a manner that completely eliminates distortion and offers tremendous cooling surface. Also, there are pistons made to the respective designs of various aero-engine manufacturers; small castings for aero-engine component parts in Specialloid approved alloy and Air Ministry specification alloys; small iron castings; samples of cylinders re-ground by Specialloid; gudgeon pins in special high-tensile steel; test pieces, and a 100-h.p. De Havilland "Gipsy" aero engine.

**Sterling Metals, Ltd. (142),**

Coventry.

This is an interesting selection of castings of engine and structural components as supplied to the leading aircraft and aircraft engine manufacturers. They include aluminium alloy castings, such as cylinder heads, engine casings, die-cast pistons, etc. There is also exhibited a selection of "Elektron" (magnesium alloy) castings from the Coventry works. These, in alloys approximately 40 per cent. lighter than aluminium alloys, will be the first substantial exhibition of castings in this metal being produced on a commercial scale.

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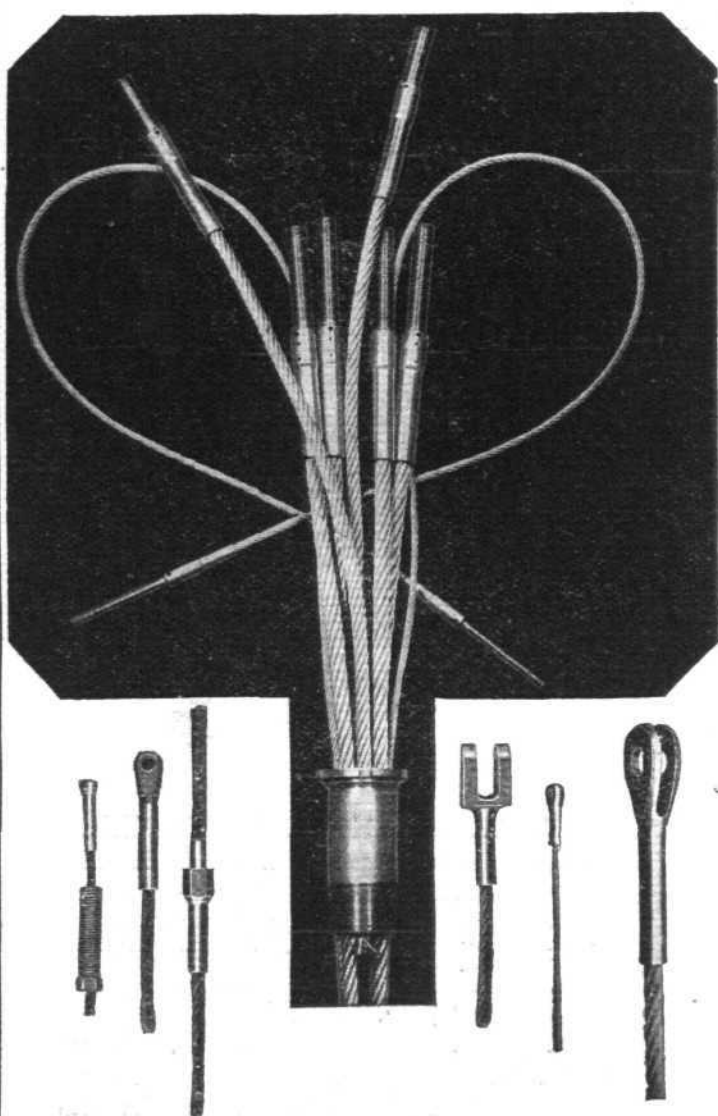
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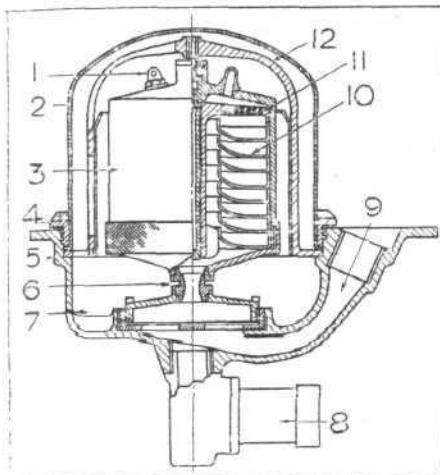
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**S. Smith and Sons, (M.A.), Ltd.**  
(143),

Cricklewood Works, London, N.W.2.

It is almost impossible to think of an aero instrument which this well-known company does not produce. On their Stand are endless specimens which,



**S. Smith and Son's "Carter" Oil Cleaner and Cooler,** (1) Oil nozzle, (2) Cover, (3) Rotor, (4) Ring Nut, (5) Body Flange, (6) Oil inlet to rotor, (7) Oil drain, (8) Relief valve, (9) Oil inlet, (10) Rotor trays, (11) Strainer, (12) Rotor cage.

M-L Magneto Syndicate, Ltd., they are developing electrical equipment for aircraft, including hand-operated generators for wireless. They are also sole exporters of the K.L.G. sparking plug, which is manufactured by another of their associate companies. Recently they acquired the manufacturing rights for aircraft of the "Carter" oil centrifuge and cooler—a most interesting component, which we hope to describe on another occasion. A sectional sketch of this device is, however, shown on this page.

**J. A. Stevens, Ltd. (73),**

Upper Rathbone Place, W.1.

This company of automobile electrical engineers is the sole agent for the Bosch magnetos, etc., in Great Britain and Ireland, and on the Stand is an exhibition of Bosch products, including magnetos, sparking plugs, dynamos, fuel injection pumps and switches, embodying many types.

One would draw particular attention to their new electrical control advance and retard ignition of Bosch magnetos for aero engines. The change over from fully advanced to fully retarded position and *vice versa* is done electrically in an entirely automatic manner without the aid of control gear and centrifugal governors.

The Bosch Magneto GF type, which has been used on many record flights,

simplify that necessary, but extremely troublesome—and, using ordinary methods, messy—operation of applying grease to those often "inaccessible" portions of the machine's anatomy.

**Thompson Bros. (Bilston), Ltd. (77c),**  
Bradley Eng. Works, Bilston.

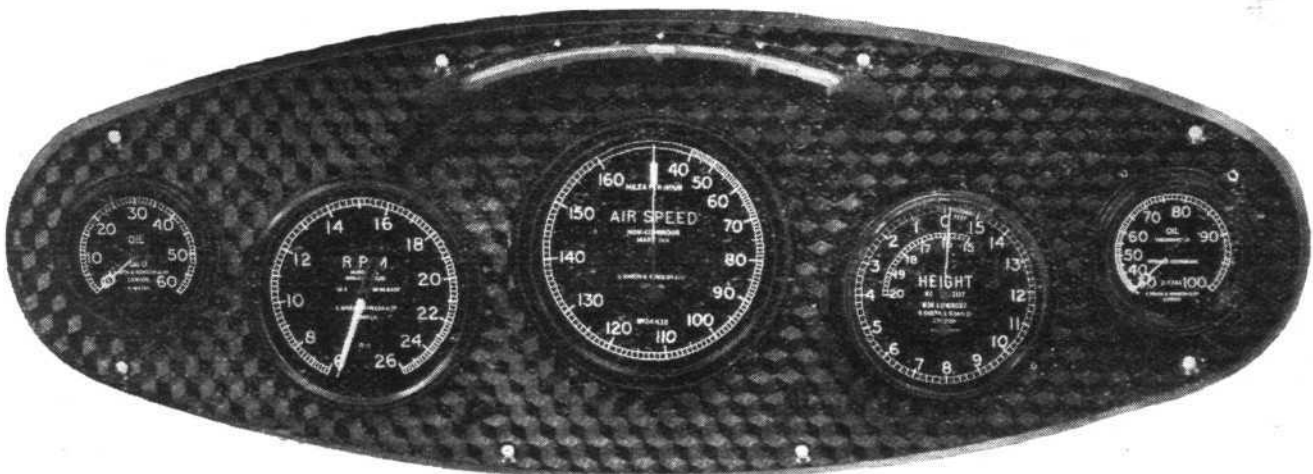
It was in 1916 that Messrs. Thompson first entered the aircraft industry, when a special department to deal with metal components, pressings and other aeronautical parts was established.

Shortly after the Armistice, and when mass-production had largely ceased, Messrs. Thompson still retained the aircraft section. In 1922 they commenced making exhaust manifolds for the Bristol "Jupiter" engines. Since then the production of these manifolds has steadily increased to the present output of 15 per week. Experiments have also been carried out with manifolds in stainless iron and stainless alloys. Examples of their work are displayed on their Stand at Olympia.

**Titanine-Emallite, Ltd. (49),**

Empire House, 175, Piccadilly, W.1.

There is an interesting test of Titanine dope to be observed on this Stand. In a glass tank of water a doped frame is immersed to illustrate the strong resistance of this dope to moisture. After a previous long test the frame was found to be perfectly taut, thus emphatic



One of several neat "Smith" Aero Instrument Boards, as fitted to the De Havilland "Hawk-Moth."

above all, are noticeable for their clean and attractive finish. Of particular interest is a panel of instruments for Schneider Trophy machines, and also the panels which are designed for light planes—namely, the "Bluebird," "Robin," etc. From this style a panel of instruments for the Blackburn "Lincock" has been designed which includes the compass.

One of their air-speed indicators is calibrated to indicate up to 400 m.p.h. The company are selling agents for Henry Hughes and Sons' compasses and navigation instruments. In collaboration with the associate company, the

produces four sparks for every revolution of the rotating inductor, and therefore requires only a low driving speed, which is a necessity now owing to the considerable stresses set up by high speeds and oscillation in modern aero engines.

**Tecalemit, Ltd. (76),**

117, Scrubbs Lane, Willesden, N.W.1.

There is exhibited an endless array of Tecalemit lubricators and Tecalemit grades of oil, as well as Tecalemit speedometers, revolution counters, and air filters. Important, in these times of speed and hurry, are the Tecalemit "guns," which greatly facilitate and

ally proving the high resistant qualities of Titanine. Another feature of the exhibit is a variety of coloured doping schemes for aircraft. They readily receive the approbation of aircraft owners who have a pride in the finish of their machines. A decorative finish is a growing practice in these days.

As well as the dopes there are examples of cellulose lacquers. A wooden propeller is beautifully finished with a lacquer and it excites the admiration of all who examine it. Lacquered metal—such as has been used on the R.100 and R.101—display the same high quality of application.



The Tecalemit Aircraft Lubricating Gun, as supplied to the Air Ministry.

**Triplex Safety Glass Co., Ltd. (24),**  
1, Albemarle Street, Piccadilly, W.1.

Large screens and windows for aircraft and goggles and masks for pilots, all manufactured with the Triplex Safety Glass, are shown. Photographs of cars which have crashed show the Triplex windows and wind screen cracked all over but still unbroken, every bit of glass still being intact in the cars. Nothing more convincing than this evidence could be imagined.

**Vacuum Oil Co., Ltd. (72),**  
Caxton House, Westminster,  
London, S.W.1.

The main feature of this Stand is a large map showing the distribution of Mobiloil in all countries of the world, also the many historic flights, such as the United States Army Air Service flight round the world, Col. Lindbergh's flight across the Atlantic, Miss Earhart's flight across the Atlantic, etc., where Mobiloil was used. They also display a series of enlarged photographs of



**The Double 10-gallon portable drum trolley specially designed for aerodrome use by the Vacuum Oil Co., Ltd.**

machines and personalities connected with such flights. An idea of the progress of Mobiloil in the aero world is given in their booklet "On Land, Sea and Air," which, apart from its propaganda purpose, is quite interesting reading. The Company recently introduced Gargoyle Mobiloil "Aero D" and Gargoyle Mobiloil "Aero H" as the result of extended research and exhaustive tests. These oils are being marketed in addition to the other well-known grades of Mobiloil used on aero-engines. They are undoubtedly a subject for discussion, as many well-known manufacturers recommend Mobiloil and are interested in the changes made to meet present-day conditions.

There is also exhibited their new trolley which holds two 10-gallon drums of Mobiloil, covering popular grades for commercial aviation use, namely "B" and "BB." The measuring pump discharges oil direct into the engine without exposing it to contamination.

**Vickers-Armstrong, Ltd. (85),**  
Vickers House, Broadway, Westminster, London, S.W.1.

The "Accessory" and component section of the house of Vickers displays

a varied array of those important items in the equipment of aircraft such as guns and armament, bombs and bomb gear, etc. The guns include the following: Vickers R.C. Class E, F, and F-twin automatic, with Vickers-Scarff wind-balanced mounting; Vickers-Armstrong Colt R.C. Automatic, and Vickers-Berthier R.C. automatic. There are also gun sights and gunnery training apparatus.

Bombs comprise 8-lb. Practice to 200-kg. Vickers-Armstrong high-explosive type. Bomb carriers of various types are also shown, together with release controls and bomb sights.

Of accessories, there are some show boards with various items mounted thereon, such as the Vickers patent Oleo pneumatic shock absorbers, Vickers-Potts oil coolers, air pumps, fuel-supply fittings, Vickers brakes, streamline wires, and tie rods.

**C. C. Wakefield and Co., Ltd. (71),**  
Wakefield House, Cheapside, London, E.C.2.

The great feature of the Castrol Stand, interesting both to the technical and non-technical public, is a collection of original FLIGHT photographs illustrating all the historical flights achieved on this all-British oil—an excellent way, we think, of demonstrating the very extensive and universal use of Castrol right from the beginning of aviation. There is also the full range of Castrol oils and greases, which includes a grade to meet every aviation, motor, and motor-cycle requirement, as used and recommended by over 230 leading motor manufacturers. In addition, a new portable oil tank is on view, specially designed for aerodrome and general aviation purposes. This tank can be run to and fro from paddock to aircraft with the greatest of ease. An apt illustration of the world-wide use of Castrol is devised on the Stand: a steady stream of oil pours upon two revolving globes. Amongst the interesting and useful literature published by the company are "Flying for All," and "Conquering the Air."

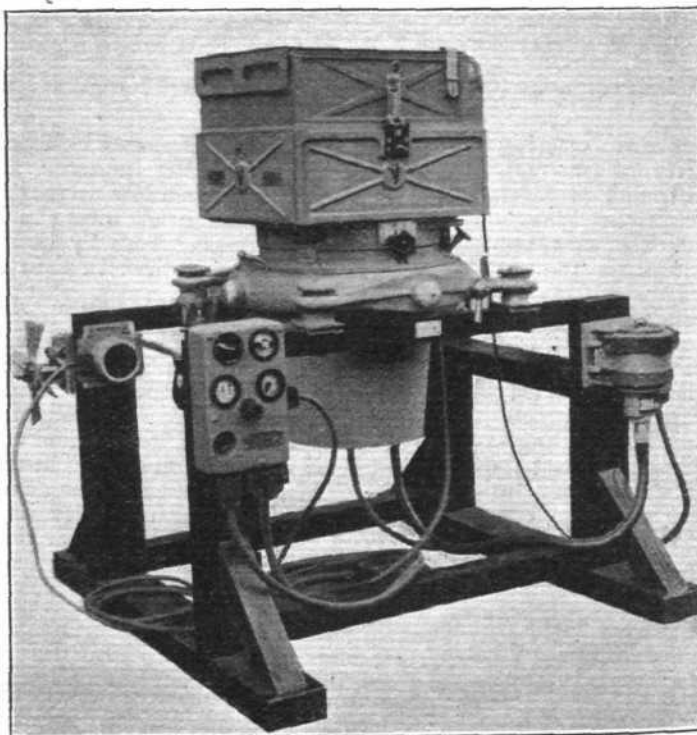
**Williamson Manufacturing Co., Ltd. (186),**

Litchfield Gardens, Willesden Green, N.W.10.

When Mr. Colin Williamson joined the business he was one of the first to realise the importance of photography from the air. As a result of his efforts, and by a gradual process of development arising out of the cinema apparatus, the firm was in a position to cope with the demands of the Air Ministry for aircraft cameras at the beginning of the Great War. During the War large numbers of the "L.B." plate cameras were made for service overseas, and at the same time experimental work was in hand with the object of producing a reliable film camera to replace the plate camera, which suffered from obvious disadvantages, such as the weight of the plates and the risk of breakage. The first Williamson film camera, the F.1, was used in 1916, but although it was reasonably satisfactory, it was not until 1919 that the advance in film and lens manufacture justified the production of a large film camera and its subsequent adoption by the British Air Ministry. The result of much research and experimental work finally had its outcome in the production of the "Eagle" aircraft film camera, which is capable of taking 100 pictures automatically by the mere operation of a switch in the electrically-operated control. On this Company's Stand are the "Eagle" aircraft camera as a complete working unit, the latest design of roll film developing apparatus to deal with film 65 ft. long, 9 in. wide and 100 exposures. The contact printer for the rapid production of prints and Williamson Automatic Enlarger are also on view.

Perhaps the most interesting exhibit is the company's new Pistol Aircraft Camera specially designed for the private owner. Incidentally, Mr. Alan S. Butler has ordered the first one.

It is very small and convenient to operate, and should prove very popular as air touring increases, for the camera is already an indispensable item of equipment with air tourists.



**The Williamson "Eagle" Aircraft Camera.**

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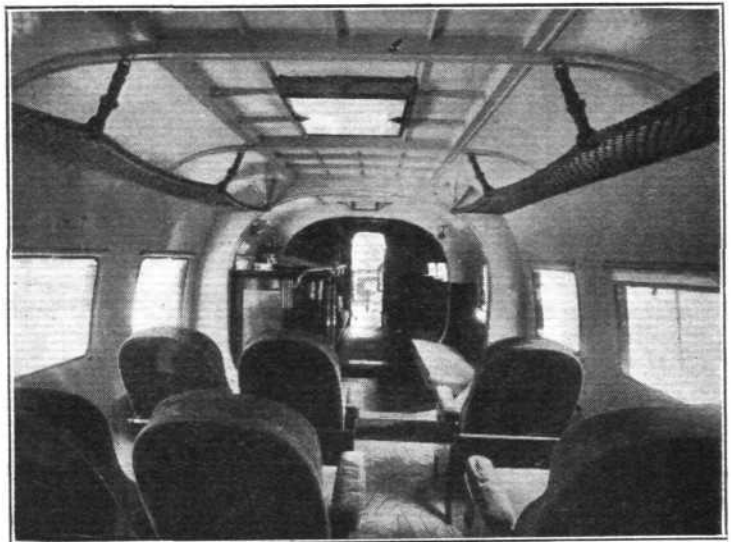
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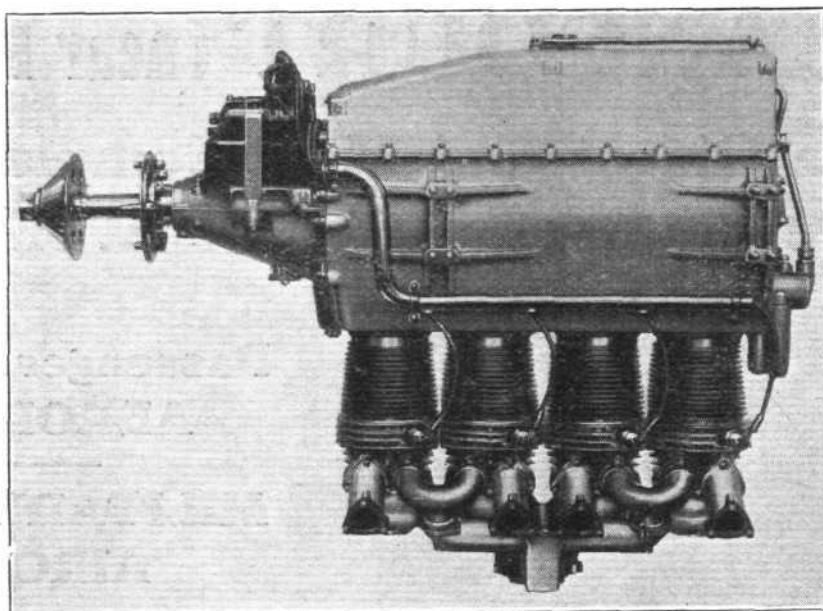
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**Wellworthy, Ltd. (126),**

Stanford Road, Lymington, Hants. These piston ring specialists exhibit many examples of their products, including the "Wellworthy" piston rings manufactured under patent process No. 151898/20, giving equalised radial and uniform pressure on the cylinder walls, and made from finest centrifugally cast metal conforming to Air Ministry specification; "Wellworthy" piston rings gauge ground on the faces for racing and other high-efficiency purposes; "Wellworthy" slotted oil control rings for controlling oil consumption; "Wellworthy" piston pots in various stages of machining and rough castings for export; and "Wellworthy" petrol priming pumps as supplied to the Air Ministry and aero engine manufacturers for aircraft engines.

**Carl Zeiss (London) Ltd. (115),**

Winsley House, Wells St., Oxford St., W.1.

Aerial Beacons, Aeroplane Landing Searchlights, and Searchlights for aerodrome illumination manufactured by this well-known optical firm, form the main exhibits on this Stand. The Beacon Light (Flulieu 360/500), is for marking air routes at night, and can be arranged for either continuous light or for flashing (white or coloured). With a 500-Watt bulb its vertical intensity is 3,000 c.p., falling to 100 c.p. in a vertical direction.

The aeroplane landing searchlight, which has a swivelling mirror, is fixed relative to the fuselage, the mirror enabling the pilot to control the direction of the projected beam and swing it up to 30° from normal position in any direction. It has an intensity of 35,000 c.p. with 100-Watt bulb, and 70,000 c.p. with 200-Watt bulb; the weight is 13 lbs.

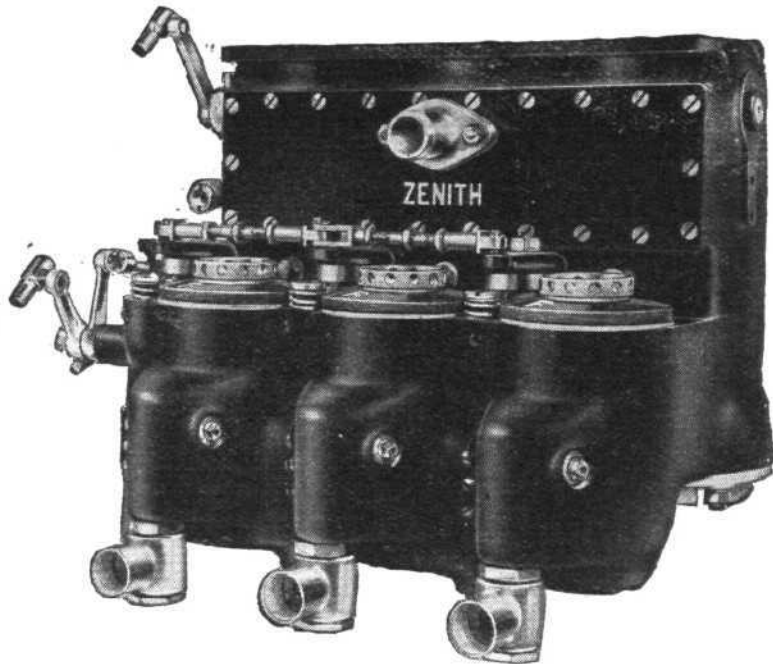
Other exhibits consist of signalling searchlights and motor-car headlamps.

**The Zenith Carburettor Co., Ltd. (136),**

40-42, Newman Street, London, W.1. Special carburation of aero engines has been studied by this company since 1913. In their research laboratories they create conditions of flight at various altitudes, such as the variations of atmospheric pressure, temperature,

standard are Salmson, Walter, Lorraine-Dietrich and Hispano-Suiza. On their Stand is a full range of Aero carburettors as well as the Zenith aero-petrol filter.

This filter has resulted from their research into the question of aero fuel filtration, and embodies their system of edge-on filtration. The petrol has



**Zenith Aero Carburettor.**

humidity, etc. They have produced many types of carburettors—for the smallest engine up to the largest. Zenith carburettors are standard on "Lynx," "Mongoose," "Jaguar," "Gipsy," "Cirrus," "Scorpion," "Hornet," "Cherub," and "Typhoon" engines. Some of the well-known foreign engines on which they are also

a free and uninterrupted passage through the filter, but every particle of foreign matter is trapped. Any water in the petrol is automatically directed to the sump, where all other impurities in the fuel are deposited. The filter passes 150 gallons of fuel per hour, and is very easily removed from petrol systems, whilst its weight is 27 ozs.

**Automobile Association Aviation Department (156),**

Fanum House, New Coventry Street, W.1.

The Automobile Association exhibit a weather map of England on which international weather symbols are employed, giving the conditions obtaining at 14 stations spread over the country. This map is maintained up to date by two daily reports supplied by the Air Ministry. The symbols denoting the state of the sky, the amount and height of low cloud, and the visibility, are the same as those used at Croydon for the main air routes. In addition to this, the A.A. have devised a symbol which denotes the direction and speed of surface wind at each station.

An aviation weather forecast is included on a separate panel, and a map of Europe is displayed, showing some of the routes that have been planned by the A.A. Aviation Department for members. Only portions of the longer routes can be shown, as, for instance, London to Port Darwin, London to Cape Town, and London to the Gold

Coast. A map of England is exhibited on which are all aerodromes at present open to traffic, whilst specimens of the A.A. air-route maps, designed and made by the Aviation Department, are also on view.

**British Engineering Standards Association (203),**

28, Victoria Street, Westminster, S.W.1.

This Association is showing the various British Standard specifications now available for the aircraft industry, as well as those drawn up for other branches of industry. They publish very complete lists of these.

**Imperial Airways, Ltd. (43),**

Airways House, Charles Street, Lower Regent Street, S.W.1.

A section of the cabin of an "Argosy" air liner is shown, with seats, windows, and fittings arranged as in the actual machine. For its full length the side is open, so one can sit in the chairs and test their comfort. Visible through the cabin windows is a slowly moving painted panorama, showing scenes taken

from the recently opened England-Egypt-India route.

A very ingenious exhibit is the large frame marked with air termini with a series of push buttons, which, when operated, give a most complete automatic guide to air travel. It shows all the big towns which can be reached by air, times of departures, and arrivals and fares, etc.

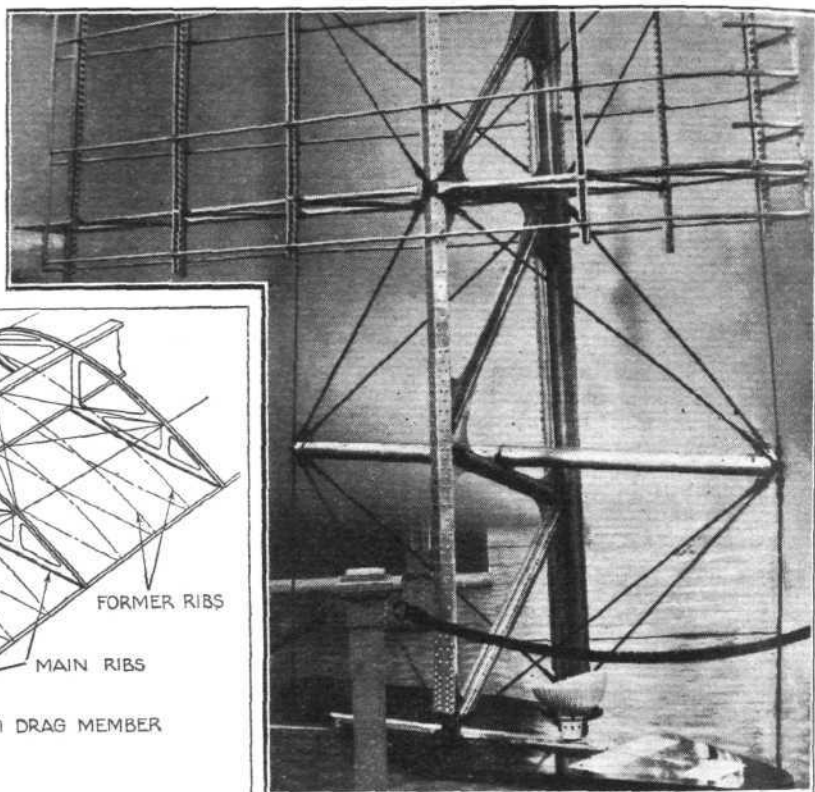
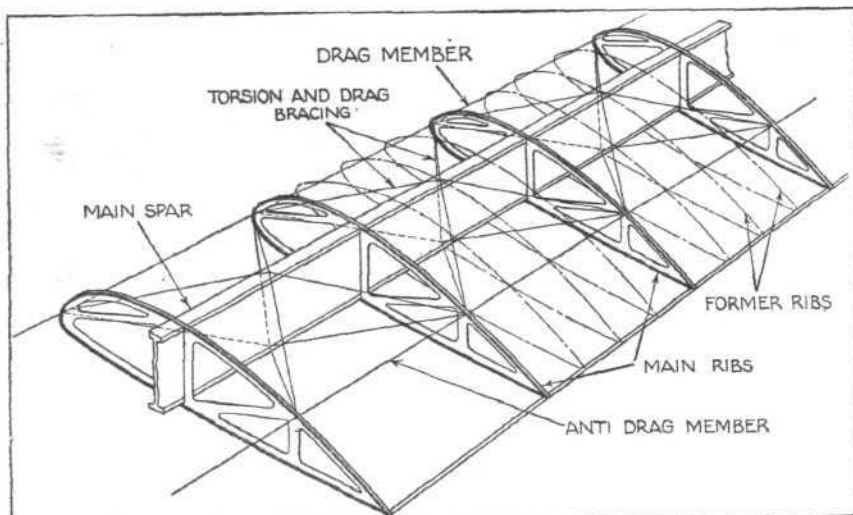
A great map of Western Europe shows cross-Channel services of Imperial Airways. Along slots in its surface, representing routes, miniature aircraft creep, telling the public at a glance the position of actual aircraft on the services. An indicator records the number of passengers who have crossed the Channel in Imperial Airways aircraft, correct up to midnight of the previous day. A series of illuminated charts show the increasing use of the air services since the inception of Imperial Airways, with the annual growth in passengers carried, tonnage of freight, and many other interesting statistics. There are also samples of the merchandise carried by Imperial Airways.

## THE STIEGER MONO-SPAR WING

**E**VOLVED by Mr. H. J. Stieger, and covered by a number of patents, the Stieger mono-spar type of wing construction is the property of the Mono-Spar Co., Ltd., of 4, Broad Street Place, London, E.C.2. The fundamental idea of this form of wing construction is to have but a single spar, placed in a position corresponding to the maximum depth of the aerofoil. At intervals strong former ribs are placed and the whole structure is stabilised by tension members. The leading edge is a tension member, as are also the diagonal bracing wires and the anti-drag member which, like the leading edge wire, runs parallel with the spar. One may

It is claimed for the Stieger mono-spar wing that it is, strength for strength, not only lighter than two-spar monoplane wings, but actually lighter than corresponding biplane wings. Tested against a metal-covered wing portion which weighed 610 lbs., it was found that the portion of a Stieger wing to replace the metal-covered wing weighed but 265 lbs., so that it represented a saving in weight, on the test piece only,

Below is shown in diagrammatic form the fundamental principle of the Stieger Mono-spar wing, and on the right a photograph of the actual test wing.

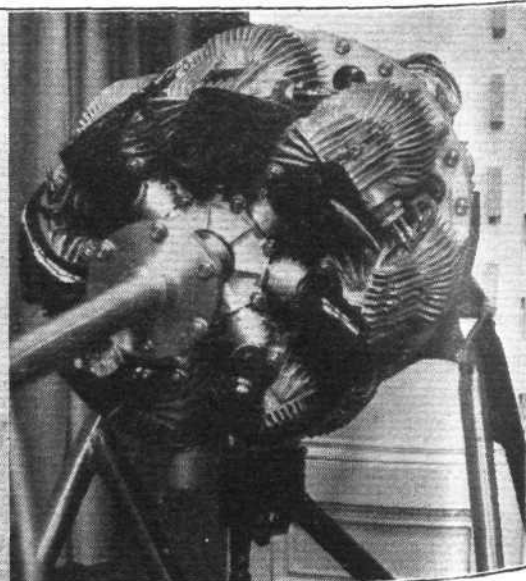
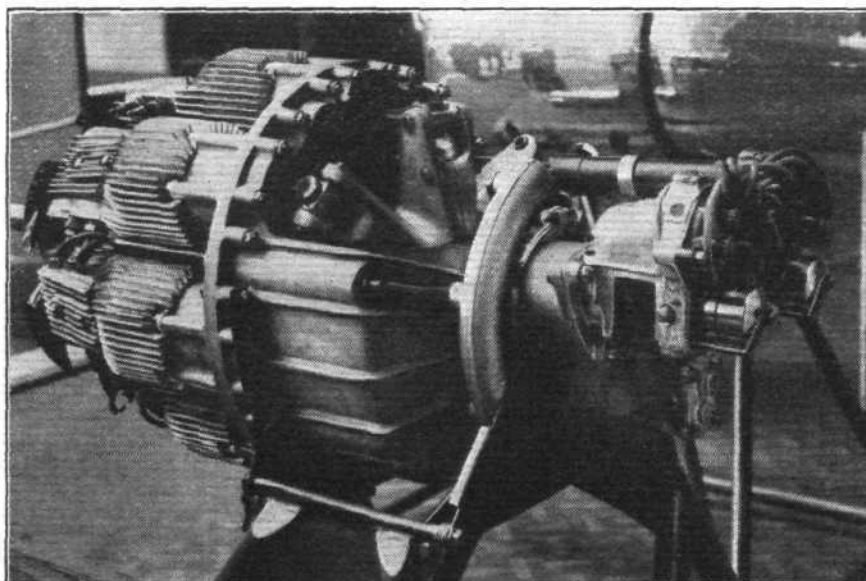


imagine the diagonal wires as forming two spirals in opposite directions around the wing. In our diagram compression ribs form the attachment of the diagonal wires, while in the actual test wing separate compression tubes were used.

On actual tests at the Royal Aircraft Establishment it was found that the mono-spar wing portion stood up to bending and torsion remarkably well, and it is worth recording that the strength of the wing was within 2 per cent. of the calculated value, so that among its other advantages the mono-spar wing appears to possess that of being statically determinate to a marked degree.

of 345 lbs. The Mono-Spar Wing Co. estimates that whereas the metal-covered wing weighed, complete, 2,700 lbs., the mono-spar wing to carry the same load could be made for a weight of 1,070, thus giving a saving in weight, on the wing alone, of 1,630 lbs.

There appears to be little doubt that a single-spar wing should be relatively cheap to manufacture, owing to the few parts of which it is composed, and if, as seems to have been proved, it is at least as light as a biplane structure to carry the same load, the mono-spar wing should have a great future. Further developments will be watched with interest.



**THE REDRUP AXIAL ENGINE:** We were unable to include in last week's issue photographs of this engine, although a description was given. Above photographs show this interesting engine from behind and from in front. ("FLIGHT" Photos.)



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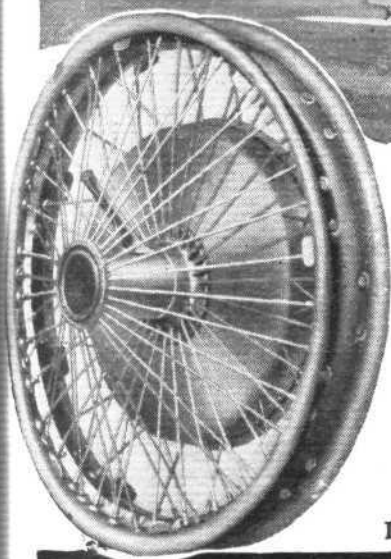
Safe landing on—

# DUNLOP

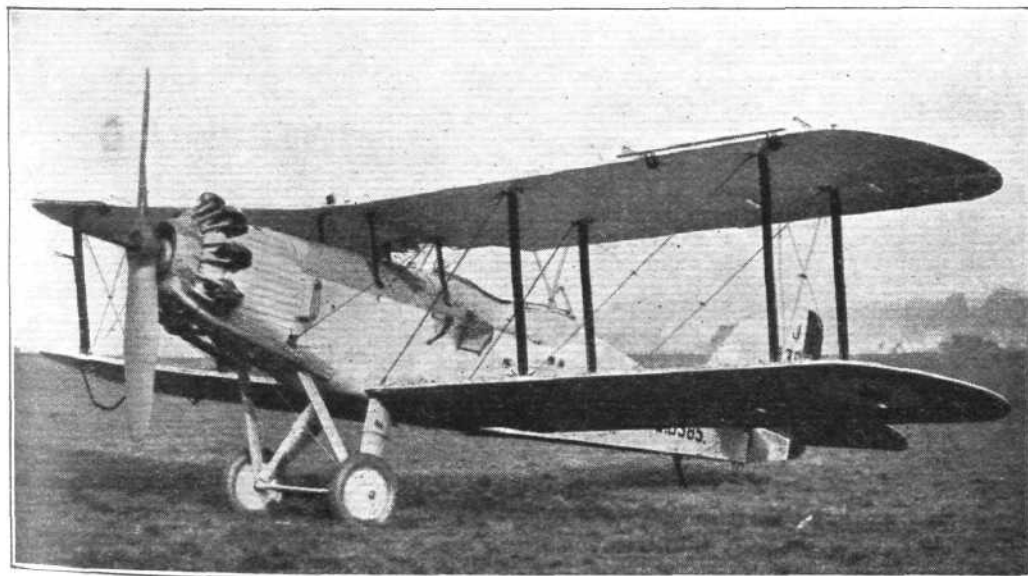
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## The WESTLAND WAPITI



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International Aero Exhibition, London, July 16 to 27, 1929. STAND No. 28.

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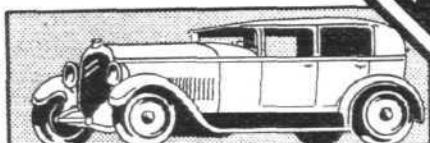
# THE WORLD'S RECORD OIL



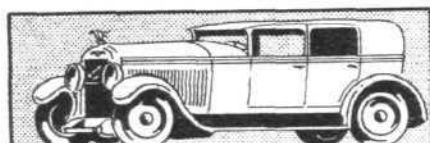
## MOTORING

*The Record of the Official World's Records*  
18 out of 35

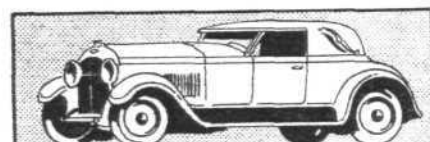
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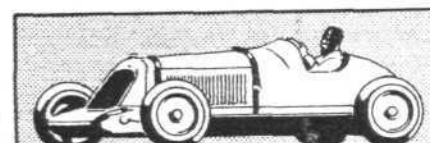
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## AVIATION

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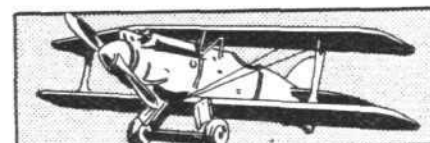
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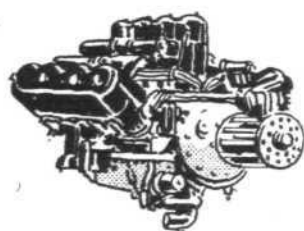


SPAD

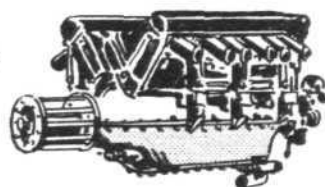


## MOTOR BOATING

*3 World's Records, 1 French Record*

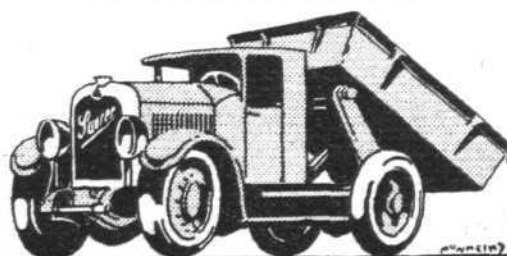


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# AVIATION BANQUET TO THE FOREIGN DELEGATES

## To the International Aero Exhibition

**A** BANQUET for the Foreign Delegates to the International Aero Exhibition was held at the Savoy Hotel on July 18. Captain P. Acland, Chairman of the Society of British Aircraft Constructors, presided over a large assembly of guests, the chief of whom were H.R.H. Prince Purachatra and The Rt. Hon. Lord Thomson of Cardington, Secretary of State for Air. In his interesting opening speech, Lord Thomson stated that it was his pleasing task to propose the toast of "The Aircraft Industries." It was his hope to see an air transport system comparable to our British Mercantile Marine, with an industry feeding it which corresponded to our great shipbuilding industry, although he trusted that it would not suffer the hardships that shipbuilding had in recent years.

Reflecting on our Air Industry, it seemed, he said, that in the years before the war it was born a weakly infant. Then came the war, when it was subjected to forcible feeding and forced to build large factories. It enjoyed a surfeit of good times! He wondered if ever Mr. Handley Page would deny those good times! Then came the Armistice, and its position was like that of a hot-house plant buffeted by the slightest wind. His sympathies were entirely with the industry. It had progressed in this country in a wonderful and amazing way. He would look back twenty years and note with interest that there were two of the original aircraft constructors with them that day. He referred to Mr. Oswald Short and Mr. Handley Page.

He heartily welcomed the distinguished visitors who honoured that banquet, and especially welcomed His Royal Highness Prince Purachatra of Siam. They were old acquaintances, as he (Lord Thomson), had had the honour of instructing His Royal Highness in military engineering many years ago. With regard to the Exhibition, said Lord Thomson, aviation was international, and the Exhibition was of the greatest interest, involving many things that should appeal to the general public. He hoped that in the future more attention would be paid to airships for he was an unrepentant believer in the lighter-than-air. Every year there was some new development, therefore every exhibition should be unique. He had had the privilege of accompanying the Prince of Wales round the Exhibition, and had noticed how the Prince had displayed a vivid and absorbing interest in everything. There were developments today which to scientists of thirty years ago would have been unbelievable.

He had been told, continued the Air Minister, that the public had not displayed the interest in Olympia which might be expected. He appealed to the general press to give the Exhibition half the publicity it would give to an air disaster. They had a tendency to record failures instead of the steady, quiet work, and the courage and faith which went to make up such an Exhibition. If more attention was given to the matter the intelligent minority who were interested in aviation would overflow Olympia to see what could be done with the air.

Mr. Handley Page responded to the toast given by Lord Thomson with one of his stirring and erudite speeches. He remarked, first, that he was deeply indebted to Lord Thomson for the review of the industry. The machines at the Exhibition were something worth telling the whole world at large. In 1909 the great question was: Has it flown? Today the question was, as Mr. Sopwith had said to him: Was there any that would not fly? At the first Aero Exhibition machines could do 50 miles per hour. Today, at Olympia, they had fighters capable of 200 m.p.h. at 20,000 ft. We should tell the world that aviation had a great advantage over every form of transport. The air was common to all of us. He could see before us possibilities unlimited for air transport. But politically, observed Mr. Handley Page, you could not get solid progress without a sound policy. The Government could help the industry by continuity—some fixed policy. He hoped that they might make as great a progress between now and the next ten years as they had in the last ten years. Mr. Handley Page also mentioned, during his speech, that they had been deeply honoured that the Exhibition had been opened by the Prince of Wales.

H.R.H. Prince Purachatra then proposed the toast of "Civil Aviation." He emphasised the importance of civil aviation to the Empire, and observed that in the outposts of the Empire they held aviation in high esteem. In his country air transport had become known even to the uneducated labourer. The Exhibition was the finest to be seen anywhere. It

showed the great development since the first Exhibition. There were machines capable of 200 miles per hour and could climb as high as Mount Everest, which seemed incredible.

The response to this toast was given by the Hon. Wm. P. MacCracken, Jnr., Assistant Secretary of Commerce for Aeronautics, America, after which the proceedings appropriately concluded with a toast to the Chairman, Capt. P. Acland, proposed by Mr. C. R. Fairey.

Amongst those present were:

Capt. W. P. van den Abeelen; Capt. P. D. Acland; Sr. Dr. Don O. Aguilar; Ahmed Izzet Bey; Capt. Akiyama; Torsten Althin; Signor Ugo Antoni; T. Angstrom; Flight-Lieut. Andersen; Lieut.-Commander N. Armand; Herr Arntzen; Sr. Don Carlos Aramayo; General Pasha Aziz Izzet; Senor Dr. Don R. A. Amador; Mr. A. J. A. Wallace Barr; General S. Bartolucci; Dr. F. W. de Oliveira Bastos; Ceples Benes; Capt. H. Beverton; Senor Beltrame; F. H. Berchtold; Mareu Beza; Capt. the Baron L. Beck-Friis; Major S. A. Biddy; Lieut.-Col. P. F. Bitossi; Capt. Biver; Sq. Comm. James Bird; Mr. Robert Blackburn; Senor Don H. Blanco Fombona; Mr. Blyth; Col. L. Boccacci; Sqdn.-Ldr. A. R. Boyle; Lieut.-Comdr. Boudouris; Mr. Robert A. Bruce; Algernon N. Breslaure; Capt. F. C. Broome; Mr. H. Burroughes; Ing. Buerkner; Sqdn.-Ldr. C. G. Burge; M. D. Caclamanos; Brig.-General W. B. Caddell; Mr. H. Cadiot; M. Calembert; Lieut.-Col. Don S. A. Casares; Capt. Castex; Commander Don G. Ceppi; Rear-Admiral Juan Cervera; Air Commodore J. A. Chamier; M. Chapuis; Dr. W. C. Chen; T. M. Chiu; Mr. J. E. Chorlton; Dr. Ing. M. Christian; Lt.-Com. J. L. Cortijo; Juan C. Costa; The Hon. Mr. Justice Costello; Rear Admiral Senor D. Cubillos; Senor Don L. Cueros-Marquez; Lt.-Col. M. O. Darby; Mons. Davidson; Sr. Don M. De Freyne; Carlos Holguin de Lavalle; Brig.-Gen. Sir C. Delme-Radcliffe; Sr. Dr. Regis de Oliveira; Sr. Carlos de Salamanca; Mons. Deschamps; Major De Soil; M. Dewile; Lt. Diaz; Lt.-Com. Dimakis; Djemal Bey; Comdr. H. F. Dons; M. E. Dubougnie; Mr. J. E. Duckham; Dir. Franz Dinslage; General Linson Dzau; Erling Eckhoff; Lieut.-Col. I. A. E. Edwards; M. Egtveldt; M. L. Ekis; Sqdn.-Ldr. England; Admiral Eo-Yang Key; Ing. Eppinger; Rear-Adm. Sr. Louis Escobar; Eshref Bey; Naval Engineer M. P. Eskildsen; Com. Eng. V. Espago; M. V. Esperson; Sr. Ortiz Etchague; Mr. C. R. Fairey; Capitan de Fragata Don Carlos Fajado; Lieut.-Com. Falconakis; Com. Don P. N. Fama; Dr. J. Ferreira de Fonseca; Feruh Bey; General Festing; Com. R. Fitzsimon; Capitan de Corbeta Don Manuel de Florez; Capt. C. C. J. Fornslev; Mr. Homer S. Fox; Mr. Ch. Frechel; Dr. Friedrich; M. J. Furnell; Sr. Don Ignatio Foster; Major Lester D. Gardner; Com. S. Garretton; Capt. R. Georgevic; P. Georgevitch; Prof. R. Giaromelli; Capt. L. W. Charley; Mr. C. C. Griffith; Mr. K. Lee Guinness; Herr Habbel; Flt.-Lt. Hagglöf; Mr. Haller; Hamanullah Subbi Bey; Direktor Hankelmann; Herr F. C. Hans; Herr Hazemann; Major H. Hemming; Col. G. L. P. Henderson; Lieut.-Col. Hori; Herr Hormel; Mr. Freeman Horn; Mr. Horter; Mr. J. W. Houghton; Hovhannes Khan Mossaed; Dr. J. B. Hubrecht; Mr. Julius Hudson; Dr. Huggenberger; Lt.-Com. Hulton; Major Hwang-Han-Hsun; Mr. John J. Ide; Ja'Far Pasha Al Askari; Com. Jensen; Mr. F. H. Jones; Col. J. Josselyn; Major H. Jullerot; Second Lieut. Kazim Bey; His Excellency General Kenan Pasha; Kiazim Bey; Lieut. Kilpi; Mr. C. H. Kirby; Redakteur Kleffel; Mr. J. Russell Knowles; Sqdn.-Ldr. A. Kubita; T. Kumpura; Major Lago; Lieut. Muguel Lagos; Senor Don C. H. Lamarche; Dipl. Ing. Rudolf Langer; C. Le Comte; Lt.-Com. Rene Wirth Lenaerts; M. Letane; Lt.-Col. Lewiandowski; M. Libohava; Alonzo Limb; Mr. Stephen Loosen; Mr. John Lord; Mr. Eric H. Louw; Commodore Thor Lubeck; Col. J. Lucas; Mr. R. S. Luen; K. H. Lui; Senor Marchado; Lervy S. Manning; M. Marabini; Col. Pole Marchetti; Hon. C. W. C. Marr, D.S.O., M.C., V.D.; A. E. Marsh Hunn; Col. J. S. Matthew, C.M.G., D.S.O.; Lt.-Eng. L. Massa; M. S. Massuger; Senor Dr. Don Jose Matos; Col. the Marquis Mayeda, C.V.O., M.C.; The Hon. W. P. MacCracken; Sir Robert McLean; Mr. R. Mejer; Capt. Mendez Ray; M. Mentrier; Col. Victor M. Merino; Senor Don A. Michelsen; Erhard Milch; Lt.-Com. M. Montis; Thos. A. Morgan; Sir Herbert Morris; Col. E. Mossberg, C.B.E.; Lt. Mujuca; Lt.-Col. Eric Murray; Mr. Newton; Mirz Mohammed Khan Nabavi; Major T. Nakashima; Necmettin Bey; Lt.-Col. H. G. Nerinx; M. Nicaise; Com. G. G. Niculescu; Emin Nihat Bey; Mr. J. D. North; Lieut. A. Nunez; Com. Don A. Obrecht; Col. J. E. O'Connor; Lt.-Col. M. O'Gorman, C.B.; M. V. Ojanson; Senor Ortiz; M. O. de Oxholm; M. Henri Perrot; Mr. F. Handley Page; Flt.-Lieut. L. G. Paget, A.F.C.; Mr. G. Parnall; Capt. Don J. Pastor; Don Guillermo Patterson; Capt. J. D. Paul; Senor Don Ocatavio M. Pereira; Senor Don E. Perez-Triana; General Pierret; M. Pitois; Sub.-Lieut. Plastiras; Mr. H. Pooley; Col. D. Preditch; H.R.H. Prince Purachatra; M. Puritz; General Manuel T. Quinones; M. le Col. Ratski; Com. Paymaster M. Reyes; Dr. A. Reyes-Guerra; Mr. R. Rhodes; Lt.-Col. Felipe M. Rivera; Capt. Ernst Rivera; M. Richard; Sqdn.-Ldr. C. A. Ridley; Mr. M. L. T. R. Ridley; Major P. Rinaldi; Sqdn.-Ldr. P. F. Rosado; Don F. Lante delle Rovere; Mr. Rocca; Mr. H. V. Robb; Sir Alliot Verdon Roe; Lieut. de Vaisseau L. M. Sala; Rear Admiral don Xavier de Salas y Gonzalez; Dr. Sarhsenberg; Major L. M. Schalin; Herr Van Scherpenberg; Mr. F. P. Scott; Major Sefik; Colonel The Master of Sempill; Capt. W. S. Sewell; Seyfettin Bey; G. Shearmur; Sherafondin Bey; Commander Prince Shimadzu, M.V.O.; Shefik Bey; Mr. W. C. Shelton; Mr. F. Short; Mr. H. O. Short; Capt. Victor Sheperd; Mr. W. Shelly; Mr. A. F. Sidgreaves; Mr. F. Sigrist; Mr. J. D. Siddeley; Lt.-Com. M. Salmon-Legagneur; Mr. B. Stephan; Flight-Engineer Sjaard; Mr. T. O. M. Sopwith; Senor Dr. G. S. Solar; Capt. Don A. Sossa Fuentes; Count Claseric Sparre; Senor Spencer; Ol. Ing. Spratter; Mr. Stanley Spooner; Mr. F. E. N. St. Barbe; Lt.-Col. H. Steensma; Capt. R. H. Stocken; Mr. F. Strover; Major J. Stewart; Capt. Stack; Dipl. Ing. Steigenberg; Capt. Suville; K. Y. Sun; Sqdn.-Ldr. Sundin; Flt.-Lt. Swedenborg; Naval Engineer Y. Tanaka; Major Tapproge; Capt. Tchaplaine; Tekin Bey; Mr. H. J. Thomas; Lt.-Com. W. D. Thomas; Rt. Hon. Lord Thomson; Col. Tomberg; Lt.-Col. J. F. de la Torre; Lieut.-Col. Don A. Torres Marva; Mr. C. Treillard; Mr. Trost; Mr. J. Parker Van Zanat; Mr. E. Van Lennep; Mr. H. T. Vane; M. Fridricks Vesmans; Capt. Count di Villarey; Major O. G. G. Villiers; P. Vuorenjuri; Mr. C. C. Walker; Mr. Wheatley; Mr. G. S. Wilkinson; Mr. F. L. Wills; Mr. C. G. H. Winter; Mr. Yamashita; Major Yashiro; Mr. H. M. Yeatman; N. Yoshida; D. Zebitch; Herr Karl Zeileissen; Zeki Bey, C.F.S.; Major Zimmer-Vorhaus.



## AUSTRALIAN MINISTER WELCOMES SQDN.-LDR. C. E. KINGSFORD SMITH AND HIS COMPANIONS

**L**AST week a luncheon at Australia House, given by Maj. C. W. C. Marr, Minister of State, Commonwealth of Australia, was the occasion for honouring Sqdn.-Ldr. C. E. Kingsford Smith and his companions, Flight-Lieut. C. T. P. Ulm, Mr. H. A. Litchfield and Mr. T. McWilliams, upon the Southern Cross flight from Australia to England.

Maj. Marr, in giving welcome to the aviators, said they were leaving the next day for Amsterdam, hence the hurriedly arranged lunch, this being also responsible for Lord Stradbroke, late Governor of Victoria, and several other absentees who would otherwise have been there to support him.

Continuing, Maj. Marr said Australia had every reason to be proud of the part played by her sons in the development of aviation. Amongst them Kingsford Smith and his companions of the air stood out for their skill, their courage and endurance. They were the first to fly the Pacific and the Tasmanian Sea, and now after an experience that would have shattered the nerves of most men, they had crossed Australia, Asia and Europe to Great Britain. It now remained for them to fly the Atlantic from East to West, across the States to the Pacific border, and they had encircled the globe. He was glad their latest flight was to the Mother Country, for they had demonstrated once again the great possibilities that aviation holds out in the speeding of communications between the two countries. Therein lay the great value of their achievement.

Consider what it would mean to the development of trade between Great Britain and Australia if they were only two weeks apart. It would ensure for one thing more frequent visits of business men to Australia which were so essential to a proper understanding of the special requirements of the Australian market. That Australia is desirous that Great Britain should take a still larger share of her import trade recent happenings could have left no doubt. But apart altogether from the benefits that accrued to British manufactures through the liberal Australian preferential tariff, it was felt in Australia, as the British Mission put it in their recent report, that "it is essential that British manufacturers should clearly appreciate the present needs of Australia, and the trend of her developing requirements." That could be best done by personal investigation. That, however, by the way.

Commercial aviation had made great strides in Australia, which was little wonder with men such as their guests, and Bert Hinkler, and others to blaze the trail, and to stimulate "air-mindedness." Sir Alan Cobham, describing his flight to Australia and back, said he came to the conclusion that Australia was the most perfect country in the world for flying, and that aviation might easily alter the whole national life of the great continent. And that was what was happening. Already air routes practically encircled the Commonwealth, and here, there and everywhere air routes were linking up the areas out-back with the cities. The latest development was the opening of the air mail service between Perth and Adelaide, which brought Melbourne four days nearer to London. And soon all the capital cities from Perth to Brisbane would be hooked up by direct air mail routes. Then there were the wonderful services that had been operated by the West Australian services in the West and North West and Q.U.A.N.T.A.S. in Queensland. And the air medical service of the Inland Mission with a doctor literally flying to the aid of sufferers out-back.

They heard about the workmen in America driving to their work in Ford cars. A few weeks ago some shearers who had finished the clip at a station 40 miles from Longreach 'phoned up to the aerodrome there for an air-taxi to come and take them to the railway station as the roads were impassable owing to floods. So the Australians were becoming an

air-minded people, and the Commonwealth Government was doing all it could to foster the spirit. Aero clubs were doing fine work, and the Government was giving them every encouragement.

To an island continent with a coast line of 12,000 miles, the importance of the aeroplane from the aspect of defence would be readily recognised, and in developing civil aviation they were at the same time strengthening the air-arm of defence. In future development of aviation in Australia Capt. Kingsford Smith and his companions would play, it was hoped, an important part. Their experience would be a great asset, and their achievements would be an incentive to the rising generation to be, literally, up and doing.

Regarding the R.A.F. Pageant, he was amazed at what they had seen. What struck him as the best was the upside-down flying. He fancied Sqdn.-Ldr. Kingsford Smith and his companions had also been flying upside down without knowing it, during their journey across.

Mr. F. G. L. Bertram, Deputy Director of Civil Aviation, in supporting the toast, said how glad he was to have the opportunity of congratulating Sqdn.-Ldr. Kingsford Smith and his companions upon their great flight, reaching England in a fortnight—really 12 days, allowing for detention on land, the distance of 9,750 miles being covered in 112 flying hours at an average speed over the ground of 90 m.p.h., a credit to crew, machine and engines. In regard to joining forces with the Australian Government, they were in close co-operation upon all civil aviation matters by means of liaison officers. The flights of Kingsford Smith and others would go down to posterity. They would, he hoped, be but the precursors to further flights, helping to create regular services. As early as 1931 it was to be hoped they would have a weekly air service to Australia, in addition to those already existing to India, etc.

Sqdn.-Ldr. Kingsford Smith, in thanking Major Marr and the company for their reception, said it was an unique privilege to meet friendly old faces in London. He would like to pay a whole-hearted tribute to Sir Charles Wakefield for his splendid work to encourage aviation. Also to the superlative flying qualities of the R.A.F., as exemplified at Hendon. There and elsewhere they had received nothing but the most courteous and helpful reception from all members of the R.A.F. Service.

Flight-Lieut. Ulm offered thanks for their reception, and said they would be amply repaid if their flight had been of practical use. At least the value of it might emerge in regard to the Singapore Base. It would be visualised that in a few years' time the R.A.F. in cases of emergency would be only two days away, to come, if necessary, to their protection. In their flight they had tried to get away from the spectacular side, rather aiming at just commonplace flying by schedule. Just one incident on the way he would mention. In Persia a difficulty arose, as, although they had permission to land, they had not permission to take off again. The British Consul, however, came to the rescue and saved the situation. Finally, Mr. Ulm paid a tribute to Bert Hinkler's flight in 15 days, just by himself, his own pilot, mechanic and navigator. It was a wonderful effort.

Amongst those present were:—

Sir James Cooper, Sir Charles Wakefield, Sir George Fuller, Sir Wm. Lathlain, Sqdn.-Ldr. L. F. Stevenson, Sqdn.-Ldr. H. N. Wrigley, Mr. Thos. Hornby, Mr. T. J. Ley, Mr. Donald McKinnon, Col. Dunlop Young, Mr. J. S. Scott, Capt. J. K. Davis (of the *Discovery*), Mr. Robert Bruce, Col. H. C. B. de Satge, Mr. John Huxham, Mr. W. C. Angwin, Mr. Hugh D. McIntosh, Capt. Robert Grieve, Lieut.-Col. Eric Murray, Mr. T. Trumble, Capt. H. J. Feakes, Capt. Duncan Hall, Maj. Berryman, Maj. R. G. Casey, and others.

### And Further Functions

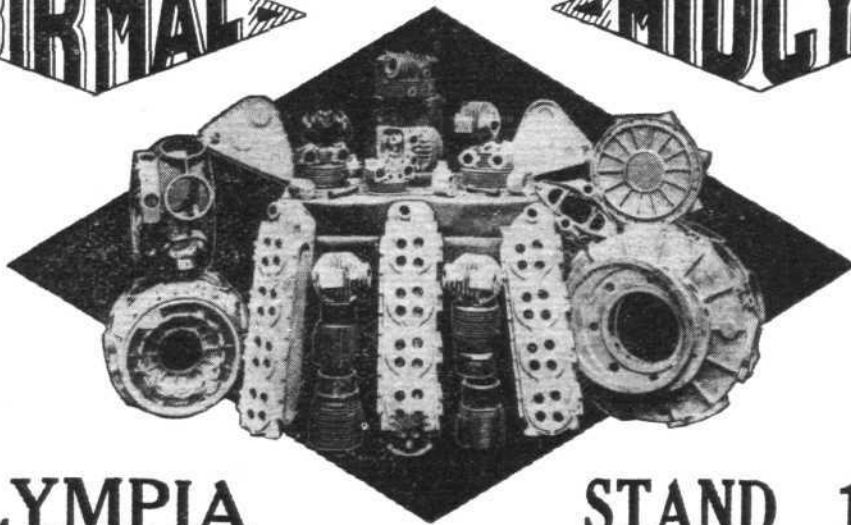
The Anglo-American Oil Co., Ltd., also gave a luncheon to the Australian airmen of the "Southern Cross" on July 17, presided over by Mr. Francis E. Powell, Chairman of the company. He paid an eloquent testimony to the fine achievement of their flight from Australia to England, and presented each airman with a handsome memento. Sir Sefton Brancker also congratulated them, whilst paying a fitting tribute to the two airmen who lost their lives searching

for the "Southern Cross" when it came down on its first attempt to fly to England.

The Australians were further honoured on July 19 when they were the guests of Sir Hugo Hirst at an informal dinner at the Savoy Hotel. Owing to an unfortunate indisposition Sir Hugo was unable to be present, but he was represented by Lady Hirst.

Mr. J. Y. Fletcher, a Director of the General Electric Company, presided.

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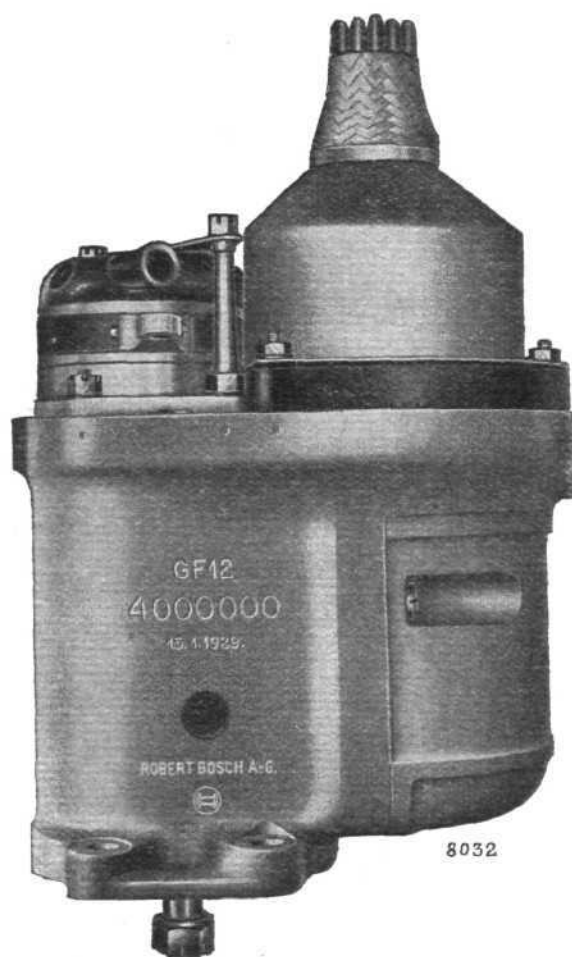
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## AERIAL GARDEN PARTY AT HESTON

THE Aerial Garden Party at Heston Air Park last Saturday, July 20, was one of the most entertaining air displays which we have witnessed. It owed its primary attraction to the variety of visiting aircraft and the pleasant international rivalry introduced in the competitions. For once we had an important aerial assembly when every machine was not a light aeroplane, although we must correct any impression that light aeroplanes were not there in force. They were easily in a majority of a fleet which swelled to 70 aircraft—

General views of the Huge Aircraft Fleet at the Heston Garden Party. There were over 70 machines, which included almost every type of light 'plane now manufactured in this country as well as many foreign machines such as the Junkers low-wing monoplanes and Klemm Salmson monoplane.

A variety of large British aircraft comprised unusual visitors to civilian air meetings, as, for instance, the Bristol "Bulldog" and Fairey III F. There could hardly be more than three British aircraft manufacturers not represented.

Amongst the new light 'planes were the Parnell "Elf" and Civilian "Coupe." One of the many D.H. "Moths" was flown over 400 miles from Cassel in Germany. A machine which made a brief flying appearance was the Hawker "Hart" (Rolls-Royce). America was represented by a Ryan monoplane and France with a Morane Saulnier.

if not more. And it must also be mentioned in their favour that as far as one could detect in the maze of machines they included almost every light 'plane type, new and old, now being manufactured in this country.

In a small way the whole aircraft collection made an Olympia Show. It was a partial transplantation of Olympia personnel and aircraft to Heston—a relief from the sterner task for a festive afternoon. The Garden Party was given by the Royal Aero Club and was remarkably well organised. In the morning there were no official events, but various flying activities provided attraction. The sky was dotted with aircraft of all shapes and sizes, and droned with the different chords struck by engines.

An event which one might consider of an ordinary character had a peculiar attraction. This was the playful flying of a Junkers K.47 low-wing monoplane (Bristol "Jupiter") with a twin-engine Junkers K.37 low-wing monoplane ("Jupiters"). The latter, a general-purpose machine of Swedish manufacture, was piloted by Lieut. O'Konnor, whilst the former machine was flown by Herr W. Neuenhofen.

### Follow-My-Leader

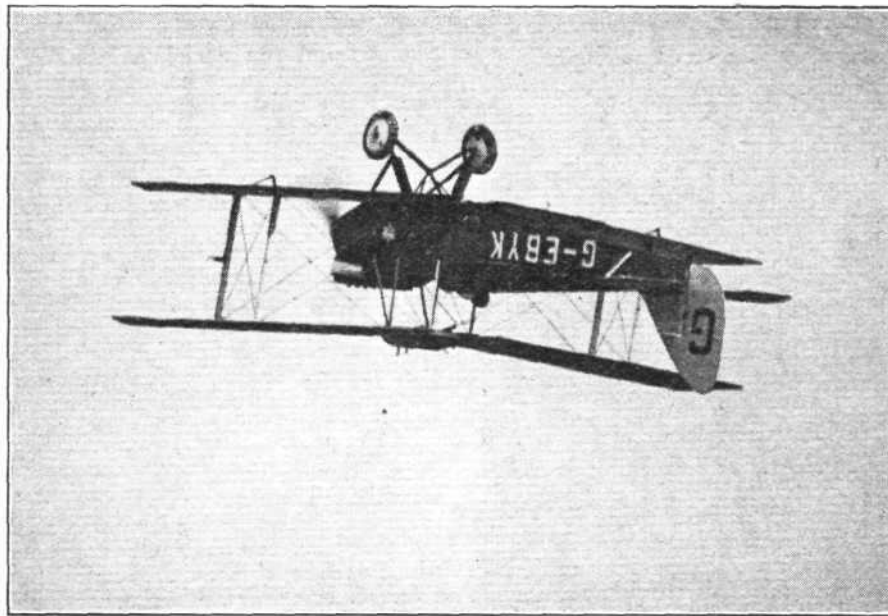
When the larger monoplane took off it began flying in low wide circles, and very soon the smaller machine dived upon its tail and began to follow its circling path at a slightly higher altitude a little to the rear. For quite 15 minutes this strange pair kept the same steady formation, although slightly losing altitude and simultaneously increasing the





angle of the turn. The single-engine machine never quite caught up to its larger playmate. As it clung on gamely, singing a higher-pitched and petulant engine tune, it irresistibly reminded one of a small boy trying in vain to catch his bigger brother.

This sort of flying is a novelty here, and in its simplicity there was a natural appeal like any true line of simplicity in art. It presented the amusing incongruity of the smaller machine seemingly pitting its strength against the stronger, the skilful low flying of the twin-engine machine and a vagueness of their combined intention in the spectator's mind. It was a sort of spontaneous orderly team effort.



**Capt. H. Broad the wrong way up at Heston Garden Party, but as he won the International Aerobatic Competition it led him in the right direction. The machine is a Gipsy-Moth. ("FLIGHT" Photo.)**

#### Competitions

After lunch the official programme commenced before a large number of guests and a large public situated in the enclosures. Loud speakers were erected at every suitable point through which amusing commentaries were broadcast of the kind which comes aptly from Mr. Will Hay, private owner pilot and variety artiste, or variety artiste and private owner pilot, whichever order he prefers. He is good as

both, so it hardly matters. In the Control Tower were the Judges, namely, Air Vice-Marshal Sir Sefton Brancker, Director of Civil Aviation, Air Vice-Marshal C. A. H. Longcroft, and Lieut.-Col. M. O'Gorman. In the field, also in an official capacity, were Sqdn.-Ldr. R. de Haga Haig, Sqdn.-Ldr. T. England, Mr. F. E. N. St. Barbe, Mr. G. Reynolds and Capt. V. H. Baker. Mr. Nigel Norman and Mr. F. A. I. Muntz were acting as perfect additional hosts.

#### International Air Rally.

Throughout the afternoon competitors arrived in the International Air Rally, but as an event this was rather overshadowed by the more concentrated events. Amidst the continual flying activity an arrival was not observed until announced on the loud speakers. But several good long-distance performances were made by competitors. The conditions which were applied to the competition were as follows: Measured in a straight line from Heston, the minimum distance to be flown had not to be less than 150 miles. Each machine had to arrive between 2 p.m. and 4 p.m. To determine the winner the







Lieut.-Col. Moore Brabazon, the first British airman to fly in this country, inspecting the "Lynx" end of the Blackburn "Lincock." He wears a slightly puzzled expression as though the "Lincock" is somehow different to the machines he made history on. ("FLIGHT" Photo.)

following formula was used:  $\frac{D}{X}$  D = distance measured in a straight line to Heston from point of departure; X = difference in speed in miles per hour between the declared speed and actual speed.

Flying Officer S. A. Thorn of the R.A.E. Aero Club was placed first. On an Avro "Avian" he flew 150½ miles. Mr. R. G. Cazalet was second, having flown from Newcastle, 254 miles, on his Westland "Widgeon" ("Cirrus"). Third place went to Mr. J. Carberry, who flew from Cassel, Germany, a distance of 428 miles in his D.H. "Moth." Mr. F. L. Turnbull was fourth. He covered 162½ miles on a D.H. "Moth."

The first local event of the afternoon was a demonstration of new types of aircraft. Several machines, including the Parnall "Elf," Klemm-Salmson and Westland three-engine cabin monoplane, took off, circled the aerodrome, performed a few stunts and landed.

**The Light Aeroplane Club Aerobatic Competition.**—Only two club instructors competed at the scheduled time in this, the second local event. They were Capt. F. R. Matthews, assistant instructor to the London Aeroplane Club and Mr. E. B. W. Bartlett, chief instructor to the Bristol and Wessex Aeroplane Club. Both flew D.H. "Moths" and were allowed five minutes each for their own selection of aerobatics. Capt. F. R. Matthews opened the combat. He looped, rolled, performed steep climbing turns, sideslipped a long distance, and flew low past the enclosures in crazy fashion. Possibly he lost points for stunting below the stipulated 500 feet, but it was a good performance from an instructor who does not often have the opportunity of performing publicly.

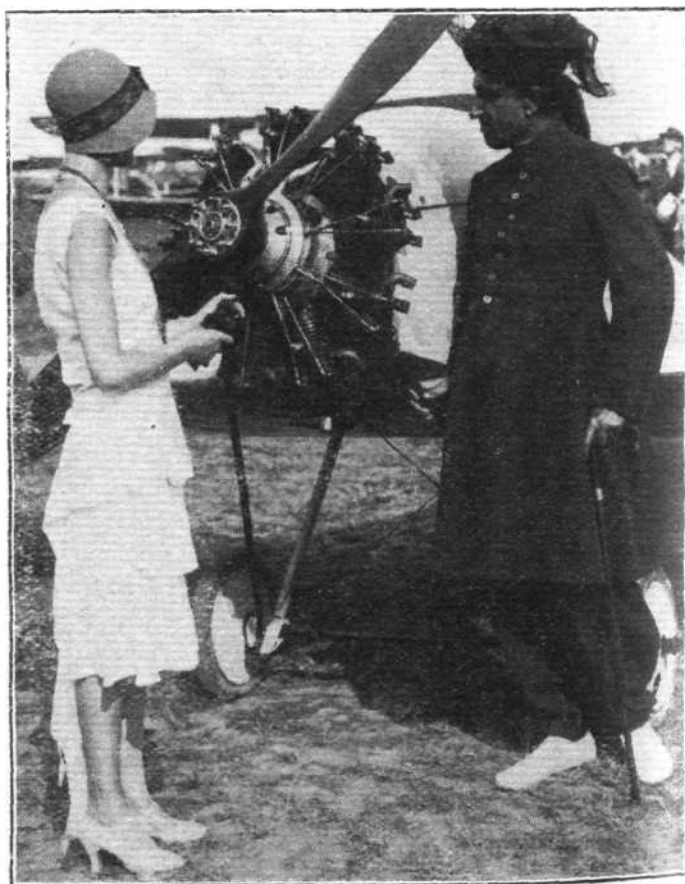
He was followed by Mr. Bartlett, who has a reputation for stunting and quite justifies it. Placing his manoeuvres well, he caught one's attention sharply with his flick rolls with the engine off and rolling out on top of a loop. He also glided steeply in an inverted position from the top of a loop to a low altitude. As expected, he won the £50 awarded by the Royal Aero Club.

**Demonstration of Model Aeroplanes.**—If any light plane club or other organising body of air-displays is searching for an event of exceptional amusement to the public and the experts alike they might consider the claims of model aircraft

demonstrators. The model competition at Heston was easily one of the happiest events of the day. These models, made and flown by members of the Halton Model Aircraft Society and the Society of Model Aeronautical Engineers, left the performances of the "real things" cold. For manoeuvrability, inherent stability, and stunting we have no aircraft to approach them. Their three-point landings and take-off from the ground were superb. Slots or other anti-stall gear they despised as antediluvian devices. Some of them simply could not stall. Others stalled and recovered as a common stunt. Sqdr.-Ldr. England even admitted this. They left him speechless. As for engine trouble, that was another utter triviality, in fact, once up, they despised their engines. Revelling in air currents, they careered dangerously amidst our heads and top wings of standing machines making hairbreath escapes and clearances, which left our crazy stunt pilots without further prestige. One of them actually landed and took off again. The only people who were not speechless with laughter were the excellent modellers. How earnest they were! Among them were Sqdr.-Ldr. Leask, Capt. Neville, Flying Officer Turner, Mr. Bullock, and several aircraft apprentices and leading aircraft apprentices. The longest flight was made by Mr. Newell's model, namely, 1 min. 8½ secs. Aircraft Apprentice Barker's model accomplished the next longest time, 1 min. 7½ secs. Leading Aircraftmen Osborne was third with 49¼ secs. and Flying Officer Turner fourth with 49 secs.

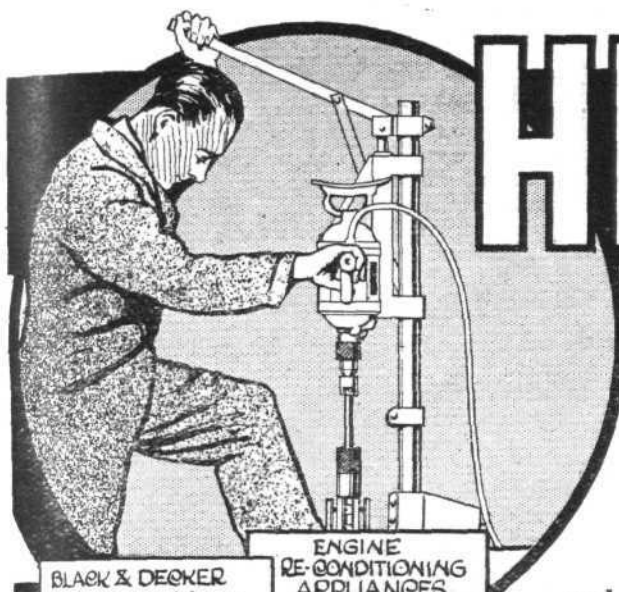
**International Aerobatic Competition.**—This was the major event of the day. There were three foreign competitors and about six English competitors. Each pilot chose his own aerobatics, and was allowed 5 mins. in which to perform them. It was actually the result of this competition which brought the greatest surprise to most of the spectators, and for that reason it needs explaining, as far as an independent witness is able to do. Capt. H. Broad was judged the winner for his performance on a Gipsy-Moth, whilst second place went to Mr. G. Murray, who also flew a Gipsy-Moth. A foreign competitor was awarded the third place. He was Herr Neuenhofen, who flew the single-engine Junkers K.47 (Jupiter).

Now, the machines engaged in this event were of many types. They included the single-engined and twin-engined



One of the machines receives the inspection of Col. Nawab Malik Sir Umar Mayat yat Khan and Miss Thompson at the Garden Party. This distinguished visitor congratulated Mr. John Trantum upon his delayed jump with the Russell "Lobe" parachute. ("FLIGHT" Photo.)

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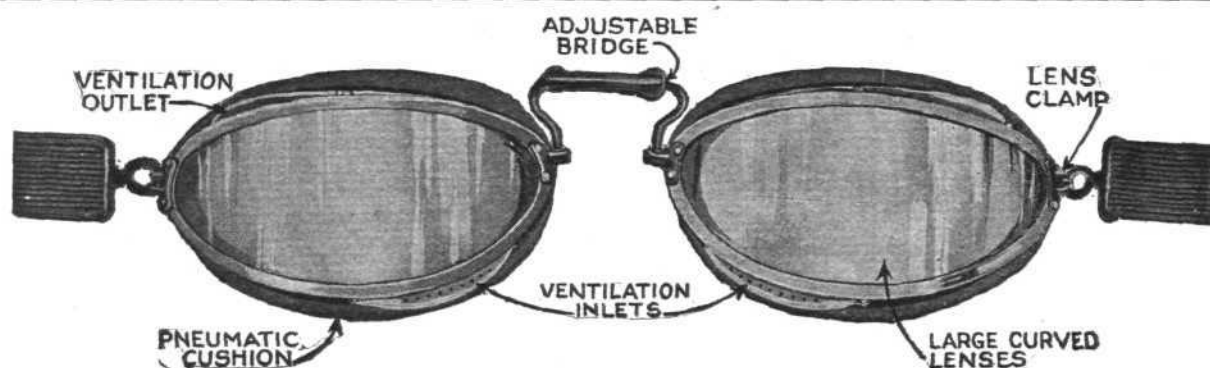
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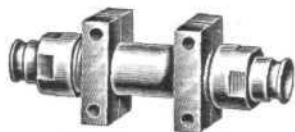
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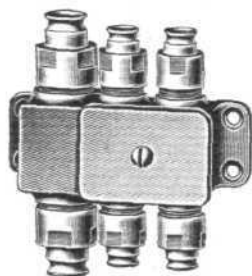
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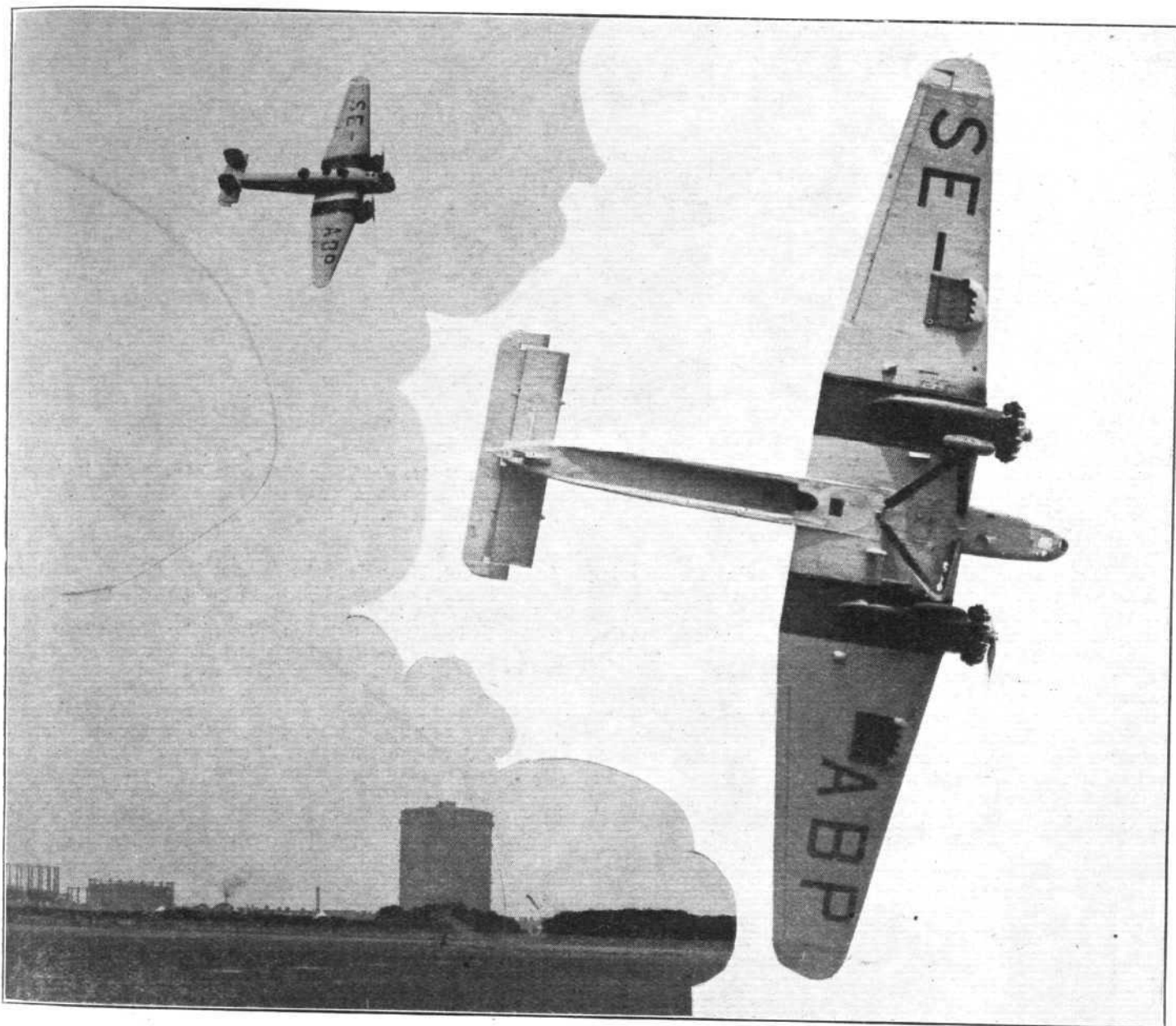
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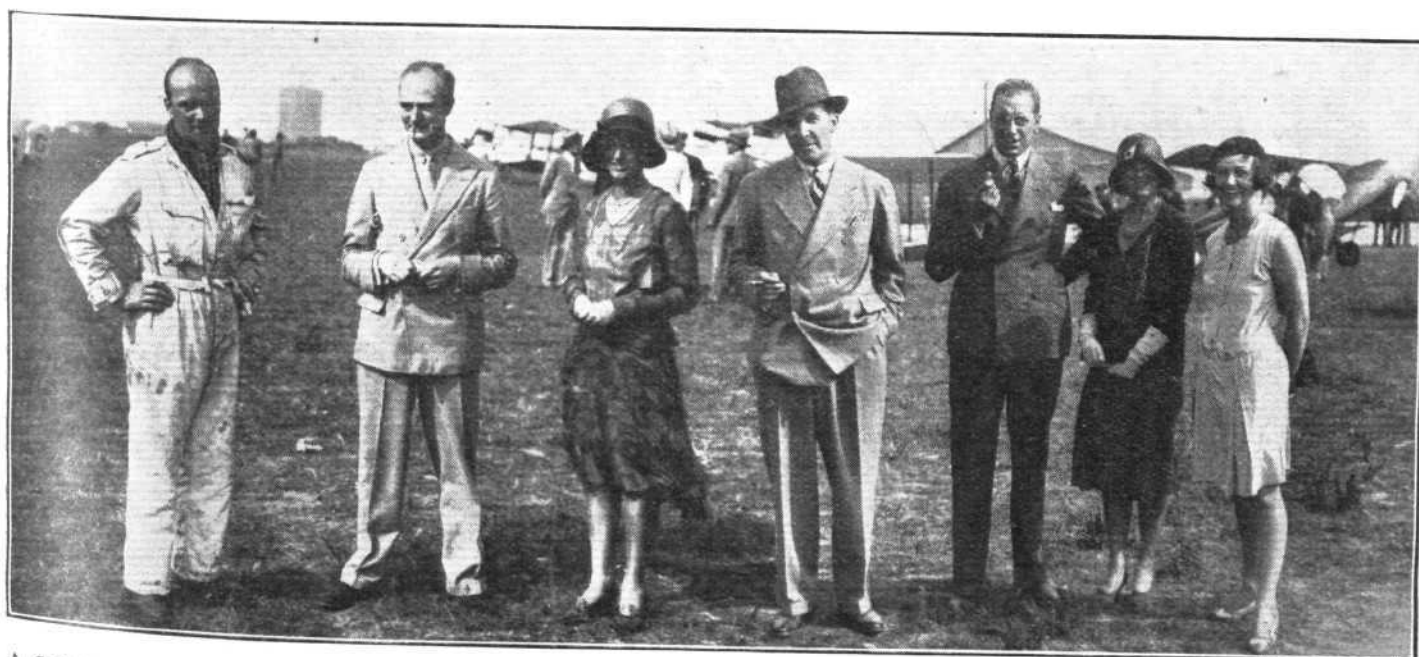
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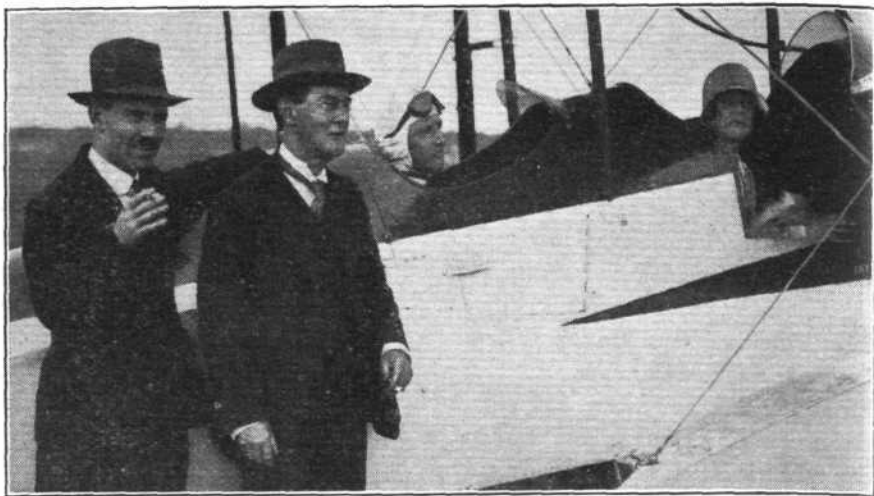
Junkers' General Purpose Monoplane (two "Jupiters") in a vertical bank over Heston on Saturday piloted by Lieut. O'Konnor. ("FLIGHT" Photo.)



A GROUP OF HESTON GUESTS: (Left to right)—Capt. N. Stack, Mr. Robert Blackburn, Miss Peggy Kirton, Maj. "Jack" Stewart, Mr. Wallace Barr, Mrs. "Jack" Stewart, and Mrs. Wallace Barr. ("FLIGHT" Photos.)

Junkers, the little low-wing Klemm Salmson monoplane, Bristol "Bulldog" (Jupiter), Blackburn "Lincock" (Lynx), Simmonds "Spartan," and the Gipsy-Moths. Most of the spectators felt sure that Mr. C. Uwins, on the Bristol "Bulldog," or Capt. A. M. Blake, on the "Lincock," or Lieut. O'Konner, on the twin-engine Junkers, deserved consideration for premier honours. The fact that they were not in the first three was received with surprise. It must be remembered that, from a spectacular point of view, fast fighting aircraft like the "Bulldog" or "Lincock," and a large twin-engine machine like the Junker, are naturally more impressive in flight than is a light aeroplane, which is relatively a fly in the sky. Therefore, the Judges in this competition would have to cast aside the natural spectacular advantages of these superior machines, for the event was one of flying skill, and not one for the superiority of machines. And along that line of judgment there was no doubt about Broad's performance. Admittedly, it still seems difficult to overlook, say, Uwins on the "Bulldog," but personally, one is inclined to think that Broad won more points for obeying orders and for his sense of showmanship than any other competitor. For instance, he did not scrape the paint off the Control Tower, or attempt to lift the wings off the standing machines. He was above a certain proper and stated level all the time, whilst great points in his show were continuity and compactness. In other words, he was in the picture all the time. You had never to hunt the sky for him. He selected a confined space in front of the Control Tower, and stunted nearly every minute of his brief time with inverted flying as a marked feature.

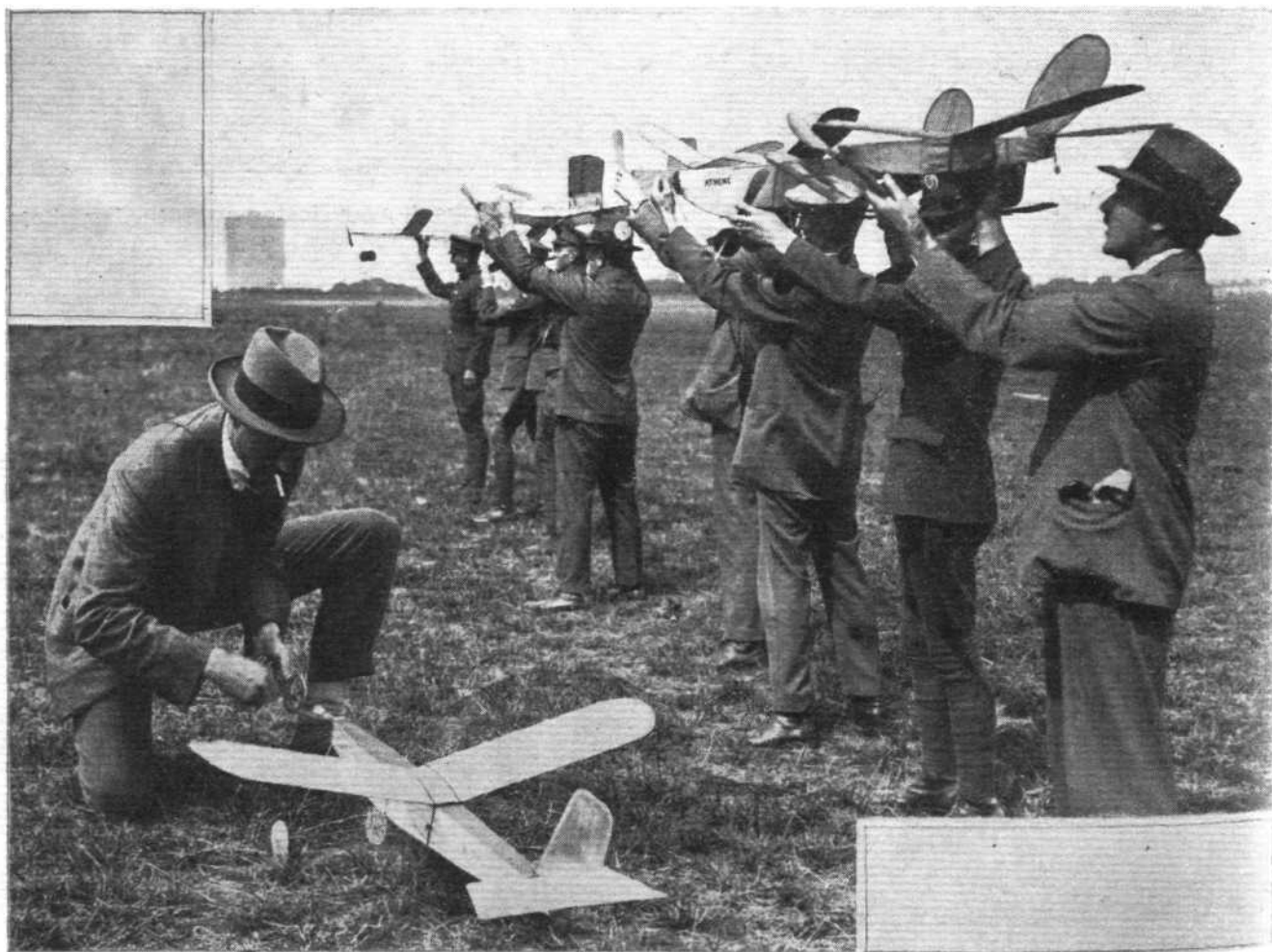
Lieut. O'Konner gave an impressive display on the twin-engine Junker, putting it into sharp vertical turns, looping low, and zooming and flying at stalling speed. The other



**A SPARTAN GROUP :** (left to right) Mr. C. Cook, Mr. Fred Simmonds, Mr. C. Staniland, the Simmonds test pilot (in the cockpit), and Miss V. Withers. ("FLIGHT" Photo.)

Junker pilot, Herr Neuenhofen, also looped and rolled, and dived forward on to his back to glide inverted for a long distance.

The little Klemm Salmson, piloted by Herr Classen, was very agile with vertical turns and interesting for its slow flying. Capt. Blake "shot up the crowd" on the "Lincock," and caught their loudest approval. If he contravened orders, and thereby put himself out of the competition, he certainly convinced us all with the remarkable performance of this light fighter from Brough. There was a genuine thrill for the guests in his long diving, followed by low flying on full throttle, to finish with terrific zooms, whilst his flick rolls, with engine off, were nice to watch. The "Lincock" (Lynx) always places the Blackburn Company in the picture at any



**To the right ! Line-up of "modellers" at Heston.** The competitor starting up his machine with a brace is Sqdn.-Ldr. Leask, and the competitor first in the line this end is Capt. Neville. The winning model flew for 1 min. 8½ secs. ("FLIGHT" Photo.)

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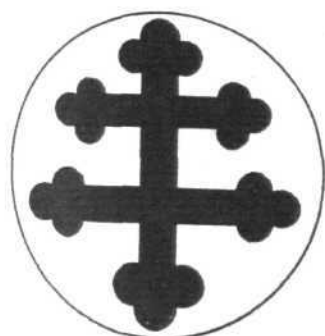
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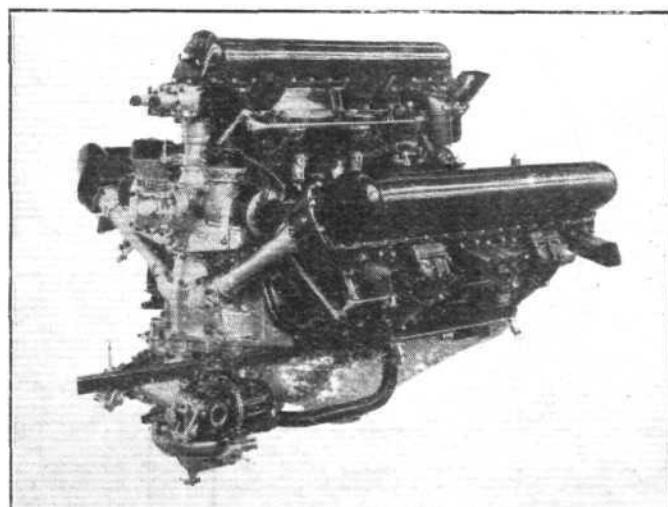
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The new Civilian Coupé at Heston which is fitted with the A.B.C. "Hornet" and carries two in the enclosed cabin. Beside the nose is Mr. Hunt, Works Manager. We described this light 'plane in "Flight," July 4. ("FLIGHT" Photo.)

meeting. It makes up for the unnecessary modesty of the "Bluebird."

Mr. C. Staniland was another competitor who did not get a place amongst the winners, but he definitely claimed our attention in the Simmonds "Spartan." An Hermes-Avian was scheduled to compete, to be flown by Capt. N. Stack. Everyone who knew Capt. Stack was disappointed when he did not appear; but he compensated us later with one of his emphatic efforts on his favourite Cirrus-Moth "UF."

While this competition was in progress an intruder appeared with a certain suggestion of defiance and showed

jerk, then descended with a noticeable steady movement, hardly any oscillation being apparent once the shock of opening had been overcome. Mr. Trantum was presented to Col. Nawab Malik Sir Umar Mayat Yat Khan, who shook hands and congratulated him on a plucky performance.

For the remainder of the evening miscellaneous flying occupied the interest of those who stayed. The Parnall "Elf," which drew much admiration all the afternoon, was very busy with passengers, piloted by Mr. Miles. A Westland "Wapiti" and the Westland cabin monoplane were continually in the air with Flight-Lieut. L. Paget, the



Junkers K.47 low-wing monoplane with twin tail (Bristol "Jupiter" engine) on which Herr W. Neuenhofen won third place and £20 in the International Aerobatic Competition. ("FLIGHT" Photo.)

what it could do in the way of climb and speed. It was the Hawker "Hart," piloted by Flight-Lieut. P. Bulman, the Hawker chief test pilot. He absorbed our closest attention for a short period and then sailed off as mysteriously as he had appeared.

There is nothing more to mention about the aerobatics except the prizes. Capt. Broad received £50, Mr. G. Murray £30, and Herr Neuenhofen £20. The others received an ovation.

#### Finale

A parachute demonstration was the last official event. Mr. John Trantum, who is always flying yet never waits to land in a machine, demonstrated one of his delayed drops with a British Russell "Lobe" parachute. He fell about 700 ft. before opening the 'chute and pulled up with a sharp

Westland chief test pilot, and other pilots sharing the duty. A civilian edition of the Fairey IIF, with a crowd in its cockpits, added to the aerial activity, flown, one believes, by Capt. MacMullan. The Glenney-Henderson monoplane attracted much notice for diving sharply and pulling up very low. It looks inverted in the air.

Amongst the aerial visitors was Mr. Leslie Irvin, who flew from Letchworth in his Ryan monoplane (Wright "Whirlwind"). France was represented (in aircraft) by a Morane-Saulnier which belongs to Mr. Trafford, America by the Ryan, and Germany and Sweden by Junkers. Capt. F. E. Guest and Lieut.-Col. Moore-Brabazon were among the guests.

Incidentally, there was a story floating about in the evening of a visitor who wanted to purchase a Gipsy-Moth on the spot for cash and fly it straight away to France.

#### Model Aircraft Competition

Model aeroplane enthusiasts, representing Great Britain, America and Holland, flew their models in competition at the Royal Air Force aerodrome, Halton, near Wendover, on July 14, for a cup presented by Sir Charles Wakefield.

Great Britain won after a keen struggle, the winning machine, which was flown by Mr. R. W. Bullock, a member of the Society of Model Aeronautical Engineers, making a flight which lasted 70½ seconds. Sir Sefton Brancker was present during the contests.



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**Nottingham Aero Club**, Hucknall, Nottingham. Hon. Secretary, Cecil R. Sands, A.C.A., 30, Park Row, Nottingham.  
**The Scottish Flying Club**, 101, St. Vincent Street, Glasgow. Secretary, George Baldwin, Moorpark Aerodrome, Renfrew.  
**Southern Aero Club**, Shoreham, Sussex. Secretary, Miss N. B. Birkett, Shoreham Aerodrome, Sussex.  
**Suffolk Aeroplane Club**, Ipswich. Secretary, Maj. P. L. Holmes, The Aerodrome, Hadleigh, Suffolk.  
**Yorkshire Aeroplane Club**, Sherburn-in-Elmet, Yorks. Secretary, Lieut.-Col. Walker, The Aerodrome, Sherburn-in-Elmet.

## LONDON AEROPLANE CLUB

**Holiday Closing Down.**—Members are informed that the club will be closed down for the staff holidays from August 2 to 17, both days inclusive. The club will reopen for flying on Tuesday, August 20, 1929.

## BRISTOL & WESSEX AEROPLANE CLUB, LTD.

(JULY 14-20).—Pilot instructor: E. W. B. Bartlett. Ground engineer: A. W. Webb. Machines in commission: (2), XF, TV. Flying time for the week: 32 hrs. 55 mins. Pupils instructed (18), 18 hrs. 45 mins. Soloists (2), 1 hr. 10 mins. Licensed pilots: (7), 2 hrs. Passengers carried: (10), 3 hrs. 25 mins.

This week-end we are rather depopulated, many members having gone to the Aero Exhibition. Mr. Bartlett won the Club Aerobatic Competition at Heston on Saturday. Owing to overhauls, we are back to one machine again, but hope soon to have all three in commission.

## CINQUE PORTS FLYING CLUB, LTD.

(JULY 14-20).—Pilot instructor: K. K. Brown. Ground engineer: R. H. Wynne. Machines in commission: RI and PM. Total for week: 36 hrs. 50 mins. Dual instruction: Capt. G. E. Took, 45 mins.; Mr. Coates, 15 mins.; Mr. Higgett, 45 mins. Mr. Hume, 2 hrs.; Mr. Whittingham, 45 mins.; Mr. Cooke, 2 hrs. 30 mins.; Mr. Wynne, 40 mins.; Mr. Lambert, 30 mins.; Mr. Cargill, 1 hr.; Lt.-Comdr. Gubbins, R.N., 30 mins. Total, 10 members, 9 hrs. 40 mins. Advanced dual: Mr. Boucher, 15 mins.; Mr. Richardson, 15 mins. Total, 2 members, 30 mins. Soloist: Mr. Boucher 15 mins. "A" Pilots.—Mr. Richardson, 8 hrs. 15 mins.; Mr. West, 5 hrs. 15 mins.; Mr. L. Edgson Wright, 30 mins.; Mr. R. Dallas Brett, 15 mins.; Mr. Somerset, 4 hrs. 30 mins.; Mr. Ellis, 1 hr. Total, 6 members, 19 hrs. 45 mins. Joy rides: 4, 1 hr. Special journeys: Lympne to Brooklands and return, 2 hrs. 15 mins.; Lympne to Littlestone and return, 10 mins.; Lympne to Folkestone Show and return twice, 30 mins. Total, 2 hrs. 55 mins. Tests (9), 1 hr. 38 mins.

The total of 36 hrs. 50 mins. recorded this week, easily breaks all club records. On Monday, Mr. Brown and Mr. Richardson flew RI to Brooklands and took delivery of PM, leaving RI for a few minor repairs, and on Wednesday, Mr. E. D. Somerset went to Brooklands and fetched RI back to Lympne.

On Saturday, Mr. Richardson was flying PM near Littlestone when No. 3 cylinder rocker bracket, holding down bolts, sheared. Mr. Richardson put PM down at Littlestone—and she was flying again in a few hours.

Mr. Coates and Mr. Lambert were new members who began instruction during the week, and we are glad to welcome back Mr. Cargill, who had been absent for some months.

Cross-country flights are now authorised for "A" licence pilots passed out by the pilot instructor, who have done at least 10 hrs. solo, and have flown within 14 days of the date on which the cross-country flight was made. Cross-country flights may only be made on Mondays and Fridays, when the club has not less than two aircraft in commission. The following aerodromes will be used as turning points only:—Manston, 23 miles; Marden, 20 miles; Penshurst, 37 miles; and Tangmere, 75 miles, while landings may be made at Shoreham, 60 miles; Croydon, 50 miles; and Brooklands, 65 miles.

## HAMPSHIRE AEROPLANE CLUB

(JULY 13-19).—Pilot instructors: Flight-Lieut. F. A. Swaffer, M.B.E., and Mr. W. H. Dudley. Ground engineers: Messrs. E. Lenny and S. Riches. Aircraft: Avian G-EBVI and Spartan G-AAFR. Flying time for the week: 47 hrs. 40 mins. Pupils under instruction (30), 27 hrs. Soloists (5), 6 hrs. 30 mins. "A" pilots: (14), 12 hrs. 40 mins.; Passengers: (2), 35 mins.; Instructors, solo and tests: (10), 55 mins.

Messrs. Galpin and Chalmers and Col. Beamish joined the club this week. Mr. Endacott successfully completed the tests for his "A" Licence on Sunday, and Mr. Mariner passed his height test on Thursday.

Members will be interested to know that the club has chartered the Isle of Wight steamer, *Prince of Wales*, for the use of members and their friends, on September 7, the date of the Schneider Trophy Contest. Tickets will shortly be available, and those who desire them should get in touch with the secretary as soon as possible. Tickets, exclusive of refreshments, will be £1 1s. each, and all applications must be accompanied by a remittance.

N.B.—The club will be closed from August 4 to 12 for the summer holidays

## LANCASHIRE AERO CLUB

(JULY 14-20).—Flying time, 25 hrs. 40 mins. Instruction (15), 12 hrs. 30 mins. Solo flights (20), 9 hrs. 45 mins. Passenger flights (9), 2 hrs. 5 mins. Tests: (10), 1 hr. 20 mins. Instruction (with Mr. Hall): Corrigan, Braids, Greg, Russell, Taylor, S., Ashworth, J. H., Stross, Miss Baerlein, Whitehouse; (with Mr. Scholes): Taylor, S., Ashworth, J. H., Riley, Kay, Gray, Wilkinson. Machines in commission: EC, MQ, QL. Soloists (under instruction): Maxwell, Greg, Taylor, S.

Pilots: Weale, Goss, Michelson, Mills, Goodfellow, Davies, R. G., Hall, R. F., Riley, Nelson, D., Kay, Lacayo, Gort, Miss Baerlein, Ashworth, W., Twemlow, Gattrill, Harrison.

Passengers (with Mr. Mills): Smith; (with Mr. Goodfellow): Pownall, Mrs. Pownall, Miss Wilkinson; (with Mr. Hall, R.F.): Mrs. Sutcliffe; (with Mr. Twemlow): Lyons; (with Mr. Gort): Miss Leigh; (with Mr. Lacayo): Jackson; (with Mr. Hall): Wood.

Mr. Taylor made an excellent first solo.

## MIDLAND AERO CLUB

(JULY 14-20).—The total flying time was 63 hrs. 26 mins. Dual, 40 hrs. 5 mins.; solo, 19 hrs. 44 mins.; passenger, 3 hrs. 50 mins.; test, 47 mins.

The following members were given dual instruction by Messrs. W. H. Sutcliffe and T. W. Nash:—T. W. Wild, Mrs. Leigh-Fermor, F. G. Robinson, R. Darlington, J. E. Yardley, B. P. A. Vallance, F. Norman, G. Norton, F. T. Lydall, L. W. Farrer, G. P. Haylock, N. B. Tompson, S. J. Eardley-Wilmot, E. Skuce, H. Coleman, H. A. Taylor, C. T. Davis, T. G. Ellison, H. G. Tower, J. R. Bond, Harvey Sangster, P. B. Hackett, E. C. Merrick, Mrs. Vereker, K. A. Whittome, J. W. Tomkins, A. F. Hill, K. S. Neale, H. Beamish, C. Blakeway, J. A. Ridsdale.

Advanced dual: S. Duckitt.

"A" Pilots: E. P. Lane, S. G. Hall, S. H. Smith, R. L. Jackson, J. Rowley, H. J. Willis, F. J. Steward, C. W. Fellowes, W. L. Handley, S. Duckitt, W. M. Morris, J. Cobbe.

Soloists:—H. G. Tower, K. S. Neale, T. W. Wild, F. G. Robinson, F. T. Lydall, G. P. Haylock, H. Coleman, P. B. Hackett, K. A. Whittome, T. G. Ellison, J. R. Bond, J. W. Tomkins, F. G. Robinson, Mrs. Leigh-Fermor, H. E. Evans, H. A. Taylor.

Messrs. K. A. Whittome, J. W. Tomkins and K. S. Neale carried out the flying tests for their "A" Licence.

Mrs. Leigh-Fermor and H. A. Taylor made first solos.

The flying time this week constitutes a club record, the previous record being beaten by over 13 hours.

## NEWCASTLE-UPON-TYNE AERO CLUB

(JULY 15-21).—Instructor: G. M. S. Kemp. Engineer: W. Dunning. Assistant: J. Tait. Aircraft: 3—PT, QV, LX. Flying time: 48 hrs. 55 mins. Instruction: 16 hrs. 50 mins. Solo training: 7 hrs. 50 mins. "A" pilots: 21 hrs. 30 mins. Passengers: 1 hr. 55 mins. Tests: 50 mins.

This last week has seen many of our young members going through their tests, viz., Mr. Anderson and Mr. Addison have been anxiously scanning the sky for a clear evening and their patience has been rewarded. Mr. Liddell, another of our pilot members, completed a very successful first solo flight on Sunday. Another new "Gipsy Moth" has been obtained by one of our members, Mr. Tomkins. Saturday was the quietest day for a long time, all the club machines being at the Air Rally at Heston.

These people on solo training were doomed to disappointment the latter part of this week, the solo machine having burst a cylinder.

## SUFFOLK & EASTERN COUNTIES AEROPLANE CLUB

(JULY 7-13).—Instructors: G. E. Lowdell, A.F.M., H. M. T. Clayton. Ground engineers: E. Mayhew, H. Brown. Aircraft: "Bluebirds" RE, SZ, UH and BF. Aerodromes: Hadleigh, Suffolk, and Conington, Cambs. Flying time by Suffolk and Cambridge Clubs as follows:—

**Suffolk Aero Club.**—Total flying time: 23 hrs. 5 mins. 13 members were given dual (8 hrs. 30 mins.); 6 members flew solo under instruction (4 hrs. 20 mins.); 6 "A" and "B" pilots flew (8 hrs. 20 mins.); 9 passenger were carried (1 hr. 15 mins.); 7 tests were made (40 mins.).

On Friday, Lord Carlow came from London to visit us, and after a few minutes' dual with Mr. Lowdell, went solo on a Bluebird. During the four days of the Colchester Tattoo, two of the club's Bluebirds and a Moth, flown by Mr. Murray, a private owner member, took part in the Display, giving an exhibition of aerial fighting and aerobatics.

**Cambridge Aero Club.**—Total flying time (9 hrs. 45 mins.). 8 members were given dual (5 hrs. 25 mins.); "A" and "B" pilots flew (1 hr. 35 mins.); 1 passenger was carried (5 mins.); 9 tests were made (2 hrs. 30 mins.).

## FROM THE FLYING SCHOOLS

### Brooklands School of Flying, Brooklands Aerodrome

(JULY 16-22).—Total flying time: 40 hrs. 50 mins.

We have been kept busy this week giving trial lessons to people who have visited the Aero Exhibition at Olympia, and we have now come to the conclusion that once a person has flown, they feel they simply must fly. We have just parted with our second Gipsy Moth to Mr. H. W. Mok, one of our Chinese pupils.

We congratulate Mr. C. B. Baker on making a very excellent first solo flight, after comparatively few hours of dual instruction.

### Phillips and Powis School of Flying, Reading Aerodrome

(JULY 12-18).—Flying time: 31 hrs. 35 mins. Instructors: Flying Officer R. T. Shepherd, Mr. H. B. G. Michelmore.

There is nothing of particular interest to announce this week. The fine weather has been very much enjoyed. Our two first soloists, Messrs. Swann and Garde, have completed successfully their first cross-country flight from Reading to Bognor and back.

## OVERSEAS CLUBS

### SINGAPORE FLYING CLUB

(JUNE 2-8).—Total flying time: 9 hrs. 50 mins. Dual instruction: 2 hrs. 55 mins. Solo flights: 4 hrs. 25 mins. Passenger flights: 2 hrs. 15 mins. Tests: 15 mins.

On June 2, G. Watts passed his "figures of eight" test. A rough sea in the evening has prevented flying on several occasions, which accounts for the small amount of time put in this week.

(JUNE 9-15).—Total flying time: 9 hrs. Dual instruction: 2 hrs. 15 mins. Solo flights: 2 hrs. 20 mins. Passenger flights: 4 hrs. Tests: 25 mins.

During the week under review, C. A. Stanley completed the necessary tests for his "A" licence.

Dual instruction is proceeding under Flight-Lieut. D. V. Carnegie, A.F.C., R.A.F., and Messrs. W. M. Blagden, H. W. Shook, and J. Pestell are carrying passengers.

Two machines have been in operation throughout the week, and it is anticipated that G-EBUK will shortly be in commission again also.

(JUNE 16-22).—Total flying time: 15 hrs. 20 mins. Dual instruction: 8 hrs. 30 mins. Solo flights: 3 hrs. 5 mins. Passenger flights: 3 hrs. 25 mins. Tests: 20 mins.

As stormy weather precluded any flying on Saturday afternoon, and none has been taking place in the early mornings, the amount of time put in during the week may be considered quite creditable.

On June 16, E. Creig completed his tests for "A" licence, and on June 18, E. A. Barbour successfully performed his first solo flight.

Three machines, G-EBUJ, E-EBUK, and G-AADK are now in commission.



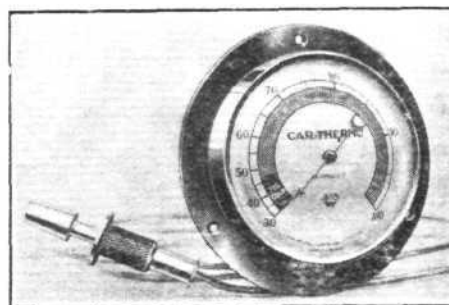


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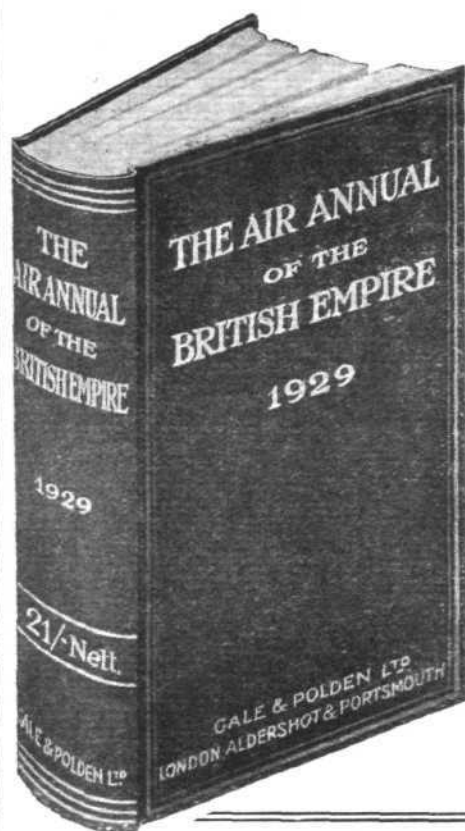
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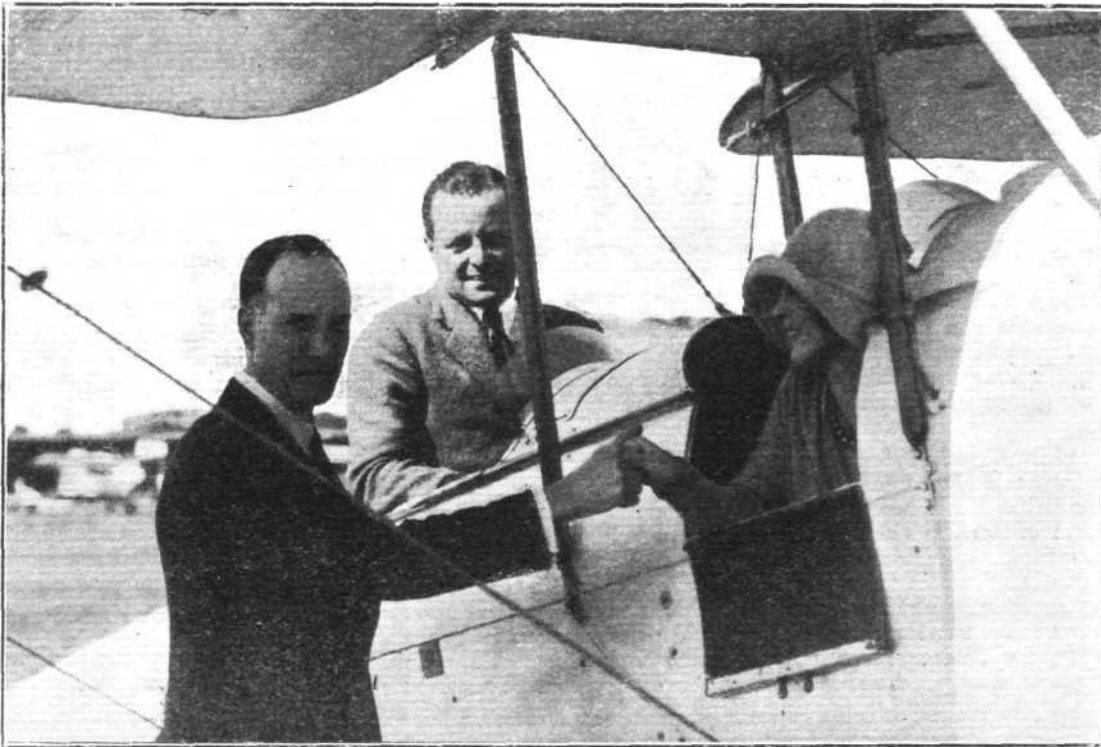
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## A WORLD TOUR BY GIPSY-MOTH

VICOMTE AND VICOMTESSE DE SIBOUR, who is the daughter of Mr. G. Selfridge, landed at Stag Lane Aerodrome last Friday, July 19, at the conclusion of their world tour by Gipsy-Moth, which has lasted 10 months and taken them 33,000 miles. The tour started last September, when they flew through France, Spain and Algeria. A forced landing was made in the Atlas Mountains in Algeria, but it was of no serious consequences, and the tourists soon continued the course along the north coast of Africa to Cairo.

the Vicomte was taken ill with appendicitis at Teheran, where he was fortunate to find a Scottish doctor to attend him. This resulted in a delay of five weeks, then the tour was restarted from Karachi.

After visiting Bombay, Delhi, and Calcutta, the course they chose led over Burma towards China in extremely dangerous country, where the mountains were covered with dense forest. A storm forced them down at Moulmein, the landing actually being made on the steep slope of a



END OF A WORLD TOUR.—Vicomte and Vicomtesse de Sibour welcomed back at Stag Lane last Friday by Capt. G. de Havilland after their world's aerial tour of 33,000 miles in the Gipsy-Moth. ("FLIGHT" Photo.)

From Cairo the tour led to Baghdad and Basra, where one of their major adventures occurred. An Englishman was reported to be in danger of an Arab attack in the Koweit country, into which he had motored in spite of official warnings. An R.A.F. punitive expedition was sent out, which the Vicomte accompanied in his Gipsy-Moth armed with smoke bombs. He was obliged to land and taxi 35 miles, when the petrol ran out, so he and his companion resorted to walking. Fortunately, they were sighted by other aircraft who reported their position. Motor-cars were sent out, and soon rescued them from the prospect of a further fifty-mile walk without food or water. Soon afterwards

disused race-course. After Moulmein came Rahing, flown along a new route, the plans of which the Vicomte has sent to the French authorities for use on their route to Saigon. They landed in Siam, at Bangkok, and inspected an aircraft factory, whilst at Saigon the tourists stayed for two months to carry out shooting expeditions. After visiting Japan, they shipped to Seattle, United States, then flew across America, making visits to Jackson, in Michigan, where Mr. Selfridge went to school. President Hoover received them, and the first country aero club in the United States was opened by them at Long Island. Then they shipped to France and visited Paris before returning to London.

### Aircraft and Shipping

WHEN the liner "Empress of Australia" reached Rimouski on July 19 an aeroplane landed upon it and took off mail for Ottawa, Montreal, Toronto, and other places. Ottawa thereby received letters from England in six days.

### Air Rally at Scarborough

AN Air Rally is being arranged at Scarborough during the August holidays which should interest private owners. Cash prizes are being offered. In the "On to Scarborough" Rally, the first machine will receive £15, the second machine £10, the third machine £7, and the fourth machine £5. In addition, the first lady passenger will receive £7 7s. and the second lady passenger £5 5s. Various events have been arranged, including an open handicap race with cash prizes of £10 and £5, also a balloon bursting competition with prizes to the value of £5 for the winner and £3 for the second. Professional pilots will perform "crazy flying" and "stunting."

Private owners and club pilots are cordially invited. The old racecourse is being used as an aerodrome. It is very large and has an excellent surface. Those intending to be present are asked to communicate with Northern Air Lines

(Manchester) Ltd., Wythenshawe Aerodrome, Northenden, Cheshire, who will send full particulars and arrange accommodation if required. Pilots should arrive at Scarborough Race Course on Saturday, August 3.

### N.F.S. Trial Training Plan

NATIONAL FLYING SERVICES announce arrangements for giving trial lessons in flying for a fee of £2 2s. at the Hanworth Aerodrome. The lessons will include preliminary tuition on the ground, when the instructor will explain the action of controls, followed by half an hour in the air in a dual-control training machine. The pupil will be given a practical demonstration of piloting, and will take over control for a few minutes at the direction of the instructor. A car will carry pupils to and from the London Air Park, starting from Trafalgar Square, and calling at Olympia while the Aero Show is in progress, without further charge. At present Hanworth is being prepared for the formal opening in the first week in September. One of the two aerodromes and a large hangar are being taken into use now, and arrangements have been made to supply refreshments to pupils. Flight-Lieut. Schofield, who was a member of the 1927 Schneider Trophy team, will be one of the instructors. Capt. N. Stack is chief pilot and air superintendent.



# AIRISMS FROM THE FOUR WINDS.

## Air Mails to India

Two important statements were made at the all-India Conference of Meteorologists, which is now proceeding at Poona, states the *Daily Telegraph*. It was declared on reliable authority that the Meteorological Department was already making preparations to co-operate in an extension of the air mail service from Karachi to Delhi by the beginning of next year, and, later, to Calcutta with weekly services. A second statement concerns the new airship R.101. It was announced that the airship was expected at Karachi in November, when it would then fly back to England almost at once, but return to Karachi once again in January to remain for a month or two.

## New Helium Deposits Found

A REPORT states that the Detroit Aircraft Corporation has been informed that new rich helium deposits have been discovered in Colorado which will be sufficient to inflate all airships constructed during the next few years.

## Flying to Iceland

A DORNIER WAL flying-boat landed at Reykjavik, Iceland, from the Faroe Islands on July 17. This machine had on board Herr Grunau, Director of the German Flying School on the Island of Sylt, Germany. It had started its tour from Sylt.

## Flight to Tokio Planned

MR. H. BROMLEY, formerly of the Royal Naval Air Service, is reported to be ready to attempt a flight from Tacoma, in Washington State, for Tokio. His proposed route is via

the Aleutian and Kurile Islands—a distance of 4,750 miles. He is said to be financed by Tacoma business men.

## Swedish Flight Over Northern Route

CAPT. AHRENBURG, the Swedish airman, who left Stockholm in June to attempt a flight to America via Greenland and Iceland, resumed from Ivigtut in Greenland on July 19 in his aircraft *Sverige*.

## Byrd Antarctic Expedition

A WIRELESS message to the *New York Times* from Commander Byrd's base in the Antarctic reports that the men of the expedition are in good health. Balloon observations are made daily and preparations are in hand for resuming scientific research when the Polar summer returns in a few months.

## Sikorsky Amalgamates

THE Sikorsky Aviation Corporation, which is amongst the leading manufacturers of amphibians in America, has been acquired by the United Aircraft and Transport Corporation of New York.

## Chili-Paris Air Mail

THE Chili-Paris air mail service was inaugurated on July 18 with the arrival of the first machine at Buenos Aires after a stay at Mendoza.

## Failure of Flight to Alaska

CAPT. R. G. HOYT, who left New York on July 18 to fly to Nome, Alaska, was forced to come down at Varmont, British Columbia, on July 21, when his machine was wrecked.

## Mr. Handley Page

THE King of the Belgians personally decorated Mr. Handley Page with the Croix Civique at Brussels on July 22. This distinction was conferred in recognition of a gallant bathing rescue effected by Mr. Handley Page last autumn at Westende Plage.

## The Pathfinder

ON July 17 the American Bellanca monoplane *Pathfinder*, which flew the Atlantic to the coast of Spain recently, piloted by Mr. R. Williams and Mr. Yancey, flew from Rome to Paris. The airmen sailed later for America from Cherbourg.

## Appointment to Mawson Expedition

SERGEANT E. DOUGLAS, Royal Australian Air Force, who took part in the search for Lieut. K. Anderson and Mr. Hitchcock in Australia recently, in connection with the then missing Southern Cross, has been appointed as second pilot to Sir Douglas Mawson's Antarctic Expedition which leaves Cape Town on October 15 next.

## Singapore Aerodromes

At a recent meeting the Straits Settlements Legislative Council agreed to a motion providing \$50,000 for the acquisition of a piece of land as a reserve for a civil aerodrome. At the present moment in Singapore aeroplanes can only land at the race-course on Balestier Plain. By courtesy of the authorities of the air base, some have been allowed to land at the aerodrome at Seletar. The first two sites hinder town development, while the military aerodrome at Seletar cannot, of course, be indefinitely open for civil use.

## New Belgian Air Port

GENERAL VAN CROMBRUGGHE, Director of Belgian Civil Aviation, opened a new airport at La Zouté, near Knoke, on July 19.

## Government's Proposals for Civil Aviation

A CONSULTATIVE committee is being formed in the interests of Government schemes for developing British air transport. The proposal, which originated with the Air Ministry, suggests a committee of six, three of whom may be political representatives of the three parties in the House of Commons, whilst the other three may be members of representative organisations of shipping, railroads and the British industry. The Under-Secretary of State for Air, Mr. H. Montague, is to be Chairman. It is understood that the Committee will explore—amongst other channels—in what direction our existing services can be supplemented and co-ordinated with other forms of transport.



**A SCHNEIDER TROPHY MEMENTO :** During a visit to Olympia, Flt.-Lieut. S. N. Webster was presented with a Souvenir Album of the 1927 Schneider Trophy Contest—which he won. Our picture shows him, beneath the "S.5", with Mr. H. T. Vane of Napier's (left) and Comdr. Bird of Supermarine Aviation Works, Ltd. (right). ("FLIGHT" Photo.)

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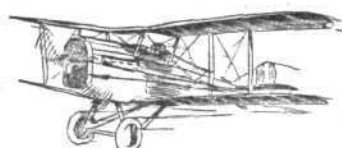
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## BLERIOT REMINISCENCE

## Twentieth Anniversary of Bleriot's Channel Flight

**T**ODAY (July 25), is the Twentieth Anniversary of the first flight across the English Channel, accomplished by M. Louis Bleriot, who landed on the Cliffs at Dover in a Bleriot monoplane on July 25, 1910. As previously announced in *FLIGHT*, M. Bleriot had intended to celebrate this anniversary by once again crossing the Channel in one of the latest type Bleriot machines, and landing at Dover today as near as possible to the site of his first landing, upon which a Memorial now stands, erected by Mr. Alexander Duckham. Owing, however, to his engagements in France, he has been obliged to postpone his crossing until Saturday, July 27.

Originally this visit was to have been more or less in the nature of a private one to his friend, Mr. Alexander Duckham

gate and leave by air for Croydon Air Port, at 3.45 p.m.

On his arrival at Croydon, at 4.30 p.m., M. Bleriot will be received by the Secretary of State for Air, Lord Thomson of Cardington; the Director of Civil Aviation, Air Vice-Marshal Sir Sefton Brancker; the President of the Royal Aeronautical Society, Col. the Master of Sempill; Comdr. H. E. Perrin, representing the Royal Aero Club; Brig.-Gen. P. R. C. Groves, representing the Air League of the British Empire; representatives of Imperial Airways, and others.

In the evening, M. Bleriot will be a guest of honour at a banquet given by the Society of British Aircraft Constructors at the Savoy Hotel, and during the proceedings a presentation will be made on behalf of the proprietors of the *Daily*



**Reminiscence :** This photograph, which Mr. Alexander Duckham kindly sent us, shows King Edward VII talking to M. Bleriot at Biarritz, on March 29, 1910. Today (July 25), is the 20th anniversary of M. Bleriot's Cross-Channel Flight, which will be celebrated on Saturday (July 27), as recorded elsewhere in this issue.

—who accompanied M. Bleriot on many of his early flights—but subsequently it was arranged to make it one of public interest, and so, on July 27, the Pioneer will be fittingly honoured by British Aviation, represented by the Air Ministry, the Royal Aeronautical Society, the Royal Aero Club, the Air League, and others.

Thus, on Saturday afternoon, a squadron of aeroplanes of the Royal Air Force will meet M. Bleriot's machine over mid-Channel and escort him to Dover, where a landing will be made at 2.30 p.m., at Swingate Down (situated about one mile from Dover Castle). Arrangements for the landing will be in the hands of the Automobile Association.

Here M. Bleriot will be received by the Mayor of Dover, Mr. Hilton E. Russell, and then conveyed by car to the Bleriot Memorial, where a reception will be held by the Mayor. After the reception, M. Bleriot will return to Swin-

*Mail*. M. Bleriot will leave London at an early hour on Sunday morning, July 28, in order to be present at Calais, where celebrations, including a rally of light aeroplanes, are being held.

M. Bleriot, piloting his type X1 monoplane, fitted with a 25-h.p. 3-cylinder "fan-type" air-cooled Anzani engine, left the French coast, at Baraques, at 4.40 a.m. (French time) on July 25, 1909, and 40 mins. later he landed in the Northfall meadow behind Dover Castle. The machine was slightly damaged in landing, and the only witness of the actual landing was Police Constable Stanford! Over the Channel, M. Bleriot flew at an altitude of 150 to 300 ft.

In conclusion, it may be of interest to note that M. Bleriot was in London on Friday last, and visited Olympia, paying his money at the turnstile, in the ordinary way, and going round the Show without being recognised!

#### The Civil Aviation Ball

THE Hon. Lady Bailey and Air Vice-Marshal Sir Sefton Brancker received the guests at the Civil Aviation Ball, which was held on July 19, at Grosvenor House, Park Lane. At midnight there was a Tableau of "Civil Aviation of Britain."

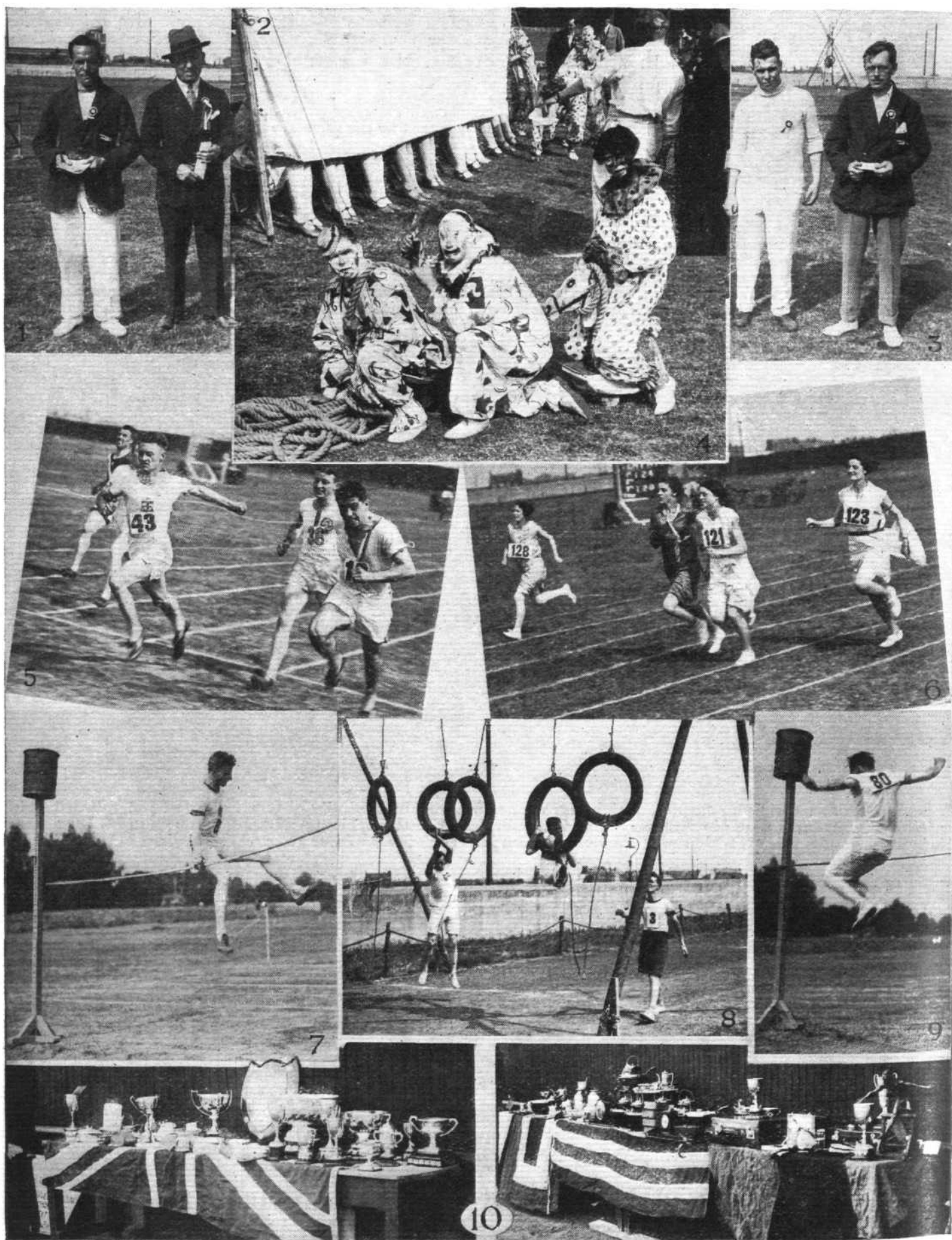
#### R.34 Reunion Dinner

MAJ. G. H. SCOTT, who commanded the airship R.34 when it made the double crossing of the Atlantic ten years ago, presided at the first reunion dinner of the crew at Bedford last Saturday. The R.34 started from East Fortune, Scotland, on July 2, 1919, carrying a complement of 33 and a stowaway. Fourteen of the officers and men attended the dinner. In silence the company honoured the memory

of Brig.-Gen. Maitland, Maj. Pritchard and Lieut.-Commander Lansdowne, U.S.A., all of whom have since lost their lives. Other members of the crew have also died. The officers present in addition to the chairman were: Wing Commander G. H. Cook (Navigator), Flight-Lieut. R. F. Durrant, Wireless Officer, and F/O. H. F. Luck.

#### British Aircraft Constructors—Please Note!

THE Commercial Secretary at Oslo (Mr. C. L. Paus, C.B.E.) reports that the manager of a local whaling company is considering the purchase of a small, slow-flying aeroplane with a big radius. Firms desirous of offering British-built aircraft can obtain further particulars upon application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. Reference No. AX. 8256 should be quoted.



**SHORT BROS. SPORTS:** (1) Mr. A. K. Thomas and Mr. A. Craig, Hon. Sports Secretary. (2) Ladies' Ankles Competition. (3) Mr. E. C. Baisley and Mr. H. Linwood, organisers. (4) Petty Officer H. D. Miller (centre) with his two assistants, Leading Stoker J. Sinclair and Leading Seaman J. Price, were excellent clowns. (5) Final of the 100 yards Open Race, Mr. P. E. King (No. 43) winning from Mr. H. E. Bulless (No. 12). (6) 100 Yards Ladies' Race. (7) Obstacle Race. (8) Mr. J. T. Pateman wins the High Jump. (9) Mr. A. K. Thomas takes second place in the High Jump. (10) The Handsome Collection of Prizes. ("FLIGHT" Photos.)

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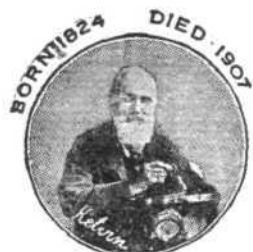
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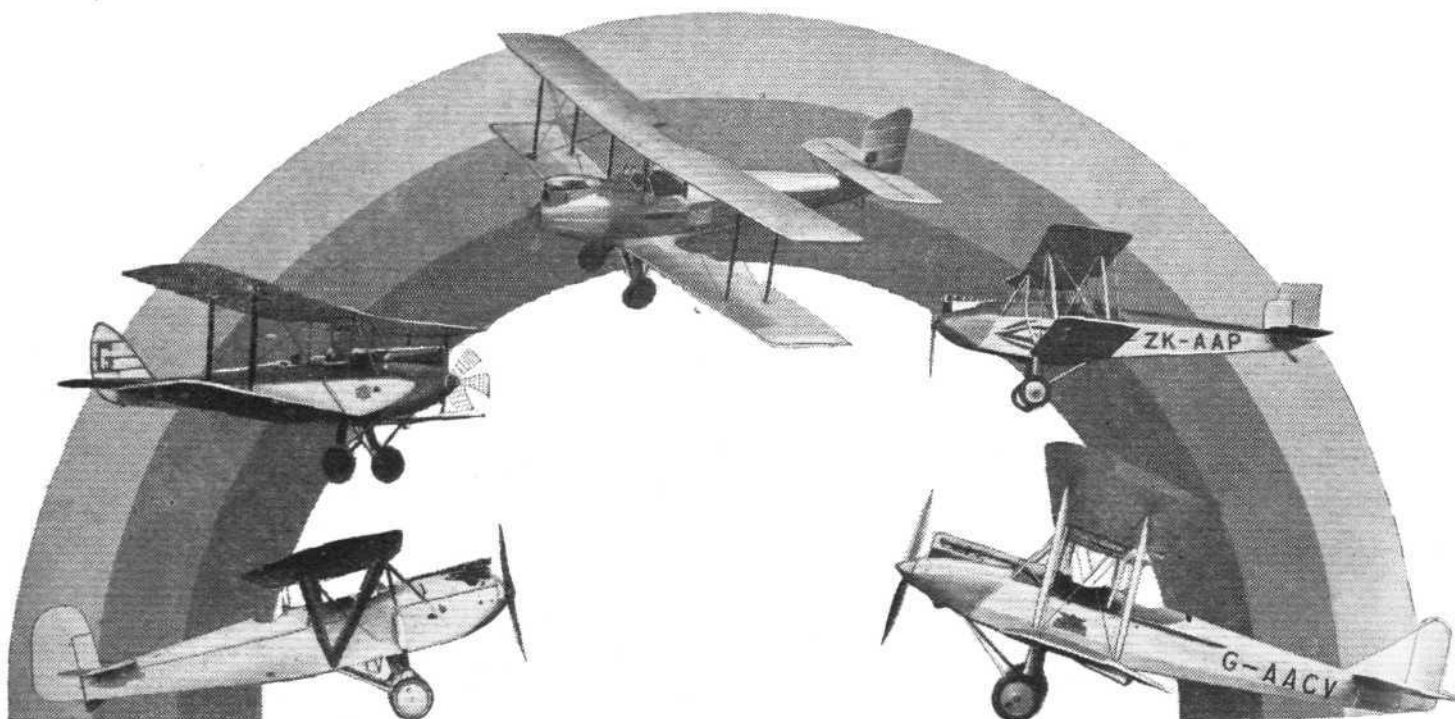
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# THE ROYAL AIR FORCE

London Gazette, July 16, 1929.

## General Duties Branch

Air Commodore P. F. M. Fellowes, D.S.O., relinquishes his appointment as Air Aide-de-Camp to his Majesty the King on promotion to Air rank (July 1). The following Pilot Officers on probation are confirmed in rank (May 25): J. C. Allan, P. J. Connolly, J. Coverdale, J. Cox, P. J. J. Cullinan, T. W. G. Eady, J. K. Flower, J. C. Harcombe, G. A. E. Harkness, C. V. Howes, R. Louis, A. C. Mitchell, E. C. Passmore, R. C. I. Pearse, P. K. Robertson, J. R. Robins, E. Rotherham, R. E. Watts, J. Wilson.

The following are promoted with effect from July 17: Flight Lieuts. to be Squadron Leaders.—G. W. Bentley, D.F.C., M. F. Browne, H. H. James, O.B.E., J. S. T. Fall, D.S.C., A.F.C., E. J. D. Routh, E. L. P. Morgan, E. H. Hooper, R. Young, H. S. Scroggs, E. F. Turner, A.F.C., C. Boumprey, D.F.C., Flying Officers to be Flight Lieuts.: A. E. Rogenhagen, N. H. N. Fletcher, C. F. H. Grace, R. E. B. Rose (Hon. Flight Lieut.), O. B. Swain, M. C. W. C. Flint, M.C., R. W. M. Hall (Hon. Flight Lieut.), R. Duncanson, A. L. R. Duke, H. E. E. Weblin (Hon. Flight Lieut.), F. L. Woledge (Hon. Flight Lieut.), F. G. Cator, M. E. B. P. Storrie, R. A. A. Cole, H. W. Raeburn, F. G. Jennings, F. Boston, T. B. Prickman, H. M. S. Wright, H. M. Whittle, A. E. Paish. The following Pilot Officers are promoted to rank of Flying Officer: P. G. Thompson (March 10); R. David (April 9); K. F. Jones (April 9); R. A. Chignell (June 9); S. O. Bufton (June 16) (with seniority of June 9); H. A. Constantine (June 17); S. R. Groom (June 17).

Air Vice-Marshal A. E. Borton, C.B., C.M.G., D.S.O., A.F.C., is placed on half-pay list, scale A, on relinquishing the appointment of Director of Personal Services, Air Ministry (July 1). Wing Commander G. H. Bowman, D.S.O., M.C., D.F.C., is placed on half-pay list, scale B (June 7 to Aug. 8 inclusive). Flight Lieut. R. de L. Stedman is placed on retired list at his own request (July 9).

The following Flying Officers are transferred to Reserve:—Class A.—E. L. Leader (July 5) (substituted for notification in Gazette of July 9). E. H. Newman (July 15). H. N. Davies (July 16). Class C.—A. T. S. Studdert (July 15).

Pilot Officer L. Currie resigns his permanent commn. (July 12). Flying Officer D. K. Hewison relinquishes his short service commn. on account of ill-health (July 16). The short service commn. of Pilot Officer on probation L. I. Gibson is terminated on cessation of duty (July 17).

## Accountant Branch

The following Pilot Officers on probation are confirmed in rank and promoted to rank of Flying Officer (June 11): M. L. Jones, C. V. Mears, R. Trippett.

## Medical Branch

H. C. S. Pimblett, M.B., is granted a short service commn. as Flying Officer for three years on active list, with effect from July 2, and with seniority of July 2, 1928. The short service commn. of Flying Officer C. Crowley, M.B., is antedated to July 2, 1928, and he ceases to be seconded to Manor House Hospital, Golders Green (July 2). Flight-Lieut. J. Twohill, M.B., is transferred to Reserve, Class D ii. (July 13).

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified:—

### General Duties Branch

Flight-Lieuts.: J. W. Colquhoun, to H.M.S. *Hermes*; 27.6.29, instead of 13.5.29 as previously stated. E. H. Hooper, to R.A.F. Record Office, Ruislip; 10.7.29. H. L. P. Lester, to Armament and Gunnery School, Eastchurch; 16.7.29. F. F. Garraway, to No. 35 Sqdn., Bircham Newton; 28.7.29.

Flying Officer S. R. Sherman, to Armoured Car Wing, Iraq; 15.6.29.

### Stores Branch

Flight Lieut. A. H. Allan, to R.A.F. Depot, Uxbridge; 11.6.29. Flying Officer J. W. Stokes, to Station H.Q., Hal Far, Mediterranean; 21.6.29.

### Medical Branch

Flight Lieut. A. Harvey, M.B., to R.A.F. Hospital, Cranwell; 19.8.29. Squadron-Leaders: R. W. Ryan, M.B., to H.Q., No. 1 Air Defence Group,

## Chaplain's Branch

The Rev. T. A. P. King is granted a short service commn. as Chaplain with relative rank of Squadron Leader (July 3).

## RESERVE OF AIR FORCE OFFICER

### General Duties Branch

The following are granted commns. in Class AA (ii) as Pilot Officers on probation:—G. J. Konried, R. S. Sikes (June 24); J. K. Watson (June 25); E. C. Fieldsend, N. D. B. Wood (July 1); D. Hay (July 3).

The following Pilot Officers of the Special Reserve are promoted to rank of Flying Officer:—J. Sillery (Aug. 15, 1928); J. F. Bristow (June 21). The following Pilot Officers on probation are confirmed in rank: M. J. R. Alderson, H. T. Edgecombe, D. R. Gray, G. J. E. Howard (July 10); S. R. Herringshaw, G. Leggatt (July 11); T. H. W. Beadle, N. F. Marsh (July 16).

Flying Officer O. V. Lee is transferred from Class A to Class C (July 12). The following Flying Officers relinquish their commns. on completion of service: E. K. Clifford (June 27); A. L. Harris (June 28); T. J. Shaw (July 5). Flight-Lieut. S. Wallingford relinquishes his commn. on appointment to a commn. in New Zealand Permanent Air Force (June 21). The commn. of Pilot Officer on probation H. C. W. Brewer is terminated on cessation of duty (May 30).

### Stores Branch

Flight-Lieut. H. W. Clarke relinquishes his commn. on completion of service and is permitted to retain his rank (June 17).

## AUXILIARY AIR FORCE

### General Duties Branch

No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—The following Flying Officer to be Flight-Lieut.: J. J. Parkes (July 5).

No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—The following to be Pilot Officer:—F. G. Murray (May 29).

No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—The following Pilot Officers to be Flying Officers:—J. M. Fosbrooke (Nov. 30, 1928); I. E. C. Watson (Jan. 22).

### Medical Branch

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—The following Flying Officer to be Flight Lieutenant.—J. S. Jerome, M.C., M.A., B.M. (July 5).

## PRINCESS MARY'S R.A.F. NURSING SERVICE

The following are appointed to permanent service (July 1):—SISTERS.—Miss E. E. Horsford, Miss E. M. Murphy, Miss H. Adams. STAFF NURSE.—Miss G. F. H. Lloyd.

## IN PARLIAMENT

### New Airships and their Troop-Carrying Capacity

COMMANDER BELLAIRS, on July 16, asked the Under-Secretary of State for Air whether he can state after consultation with the War Office, what number of troops with their necessary equipment the new airship can carry a distance of 1,000 miles or other convenient distance?

MR. MONTAGUE: Calculated on the latest estimates of weight, lift and fuel consumption, the number of troops with equipment which either of the new airships should be able to carry for 1,000 miles is 200; but I should prefer not to pledge myself to this figure until the airships have been put through their trials in the autumn.

### Sheffield Aerodromes

MR. LOUIS SMITH asked, on July 17, the Under-Secretary of State for Air whether, in view of the fact that there are no nearer aerodromes to Sheffield than Cranwell, Manchester, Nottingham and Leeds, he will consider the possibility of granting financial assistance towards the establishment of an aerodrome at Sheffield, especially in view of the constitution of a flying club in the city and of the value which such an aerodrome would be to the commercial development of the town?

MR. MONTAGUE: Many towns are giving active consideration to the provision of aerodromes for public use without financial assistance from the central Government, and I am not aware on what grounds Sheffield could claim exceptional treatment. I agree that an aerodrome should prove of value for the commercial development of the Sheffield area, and I should hope that this will lead the city council to provide the necessary funds.

### Royal Air Force Display, Hendon

MR. LEES asked what has been the actual cost to the nation of the Royal Air Force display at Hendon on Saturday, July 13, 1929?

MR. MONTAGUE: The cost of all special arrangements and facilities for spectators at the display is met out of the receipts. The ordinary running expense of personnel and material employed in the display is not segregated from the normal service expenditure on training, of which it forms part.

### Air Force Expenditure

MR. MONTAGUE, in answer to Sir J. Power, said in estimates of expenditure on the Air Forces of other Air Powers, there is great diversity in the organisation of the Air Services of foreign countries, and it is not possible in many cases accurately to segregate the air force expenditure from civil air expenditure on the one hand, and, on the other, military and naval expenditure generally. A calculation has, however, been made in the case of the United States, France and Italy, which indicates that estimated air expenditure, both military and civil, for 1929 shows the following approximate percentage increases over the corresponding figures for 1924: United States, 160 per cent.; France, 90 per cent.; Italy, 55 per cent.

I should add that these figures do not pretend to be more than approximations. This is particularly so in the case of France, since French air Estimates for 1929 are cast in an entirely different form from those of 1924 owing to the recent creation of an independent Air Ministry. The percentage increase figure given above has, however, been arrived at after allowing for this factor so far as possible.



## AIR MINISTRY NOTICE TO AIRMEN

### Heston Aerodrome, Hounslow, Middlesex : Approval as a Customs Aerodrome

1. HESTON Aerodrome, Hounslow, Middlesex, is, with the concurrence of the Commissioners of Customs and Excise, approved as a Customs Aerodrome under para. 2 of Schedule VIII to the Air Navigation (Consolidation) Order, 1923.

2. The necessary directions under the above-mentioned Order will be published in due course as the Air Navigation Directions, 1929 (A.N.D. 4F), which will come into operation on July 9, 1929, and will cease to be in force on August 3, 1929.

(No. 38 of 1929)

### High Speed Practice Flying in the Vicinity of Calshot

1. The Royal Air Force High Speed Flight temporarily stationed at Calshot will be carrying out practice flying in the vicinity of Calshot from the date of this Notice to the date of the Schneider Trophy Contest, September 7, 1929, and foreign teams will also be practising in the same vicinity from August until the date of the Contest.

2. The practice area is that bounded by Calshot Castle, Stone Point, Egypt Point, Hillhead, Chilling, Calshot Castle.

3. Pilots of civil aircraft are warned not to enter the area in question under 1,500 ft. unless they are proceeding to or from the R.A.F. seaplane station, Calshot.

4. When high speed aircraft are practising, the following signals will be displayed from the end of Calshot Spit :—

One white strip 18 ft. by 3 ft. as soon as the aircraft leave the slipway.

A second strip will be placed across the first when the aircraft takes off.

The second strip will be removed immediately all high speed aircraft engaged in practice flying have landed.

5. Pilots of aircraft proceeding to the R.A.F. seaplane station, Calshot, should, as far as possible, remain outside the practice area and exercise the utmost caution in landing when the above-mentioned signals are displayed.

(No. 39 of 1929.)

### Use of Light Aircraft for "Wing-Walking" Demonstrations

(1) The attention of all concerned is directed to the structural damage which may be caused through demonstrations of "wing-walking" being carried out during flight on light aeroplanes such as the De Havilland "Moth," Avro "Avian," Blackburn "Bluebird," Simmonds "Spartan," etc.

(2) If the practice of "wing-walking" on the type of aircraft referred to above is pursued, it will be necessary for the Air Ministry to prohibit it under Article 9 (4) of the Air Navigation (Consolidation) Order, 1923.

(No. 41 of 1929.)

## AIR MINISTRY NOTICE TO GROUND ENGINEERS

### Avro "Avians" : Bottom Front Centre Section Spars

(1) "Avian" Mark III, IIIA and IV

The spruce bottom front centre section spar in the fuselage is liable to split along the line of the bolt holes. This member should be frequently inspected and, at the first sign of splitting, Modification No. Avian/25, which consists of replacing the existing spruce spar by a birch multi-ply spar of identical cross-sectional dimensions, should be embodied.

(2) "Avian" Mark IV M.

It has been found on inspection that the bottom front centre section spar in the fuselage is liable to become considerably bent in use, especially after a heavy landing. Frequent inspection of this member should be made and, if any bending becomes evident, the centre section spar should be replaced by a modified spar to drawing No. D 1157, Issue 1, by Messrs. A. V. Roe & Co. Ltd.

(3) No Certificate of Airworthiness will be issued or renewed in respect of "Avian" Mark III, IIIA, IV and IV M aircraft unless the above-mentioned modifications have been satisfactorily incorporated.

(No. 11 of 1929)

## PERSONALS

### Married

SQUADRON-LEADER F. M. ROPE, R.A.F., son of late Dr. Rope and Mrs. Rope, The Priory, Shrewsbury, was married on July 2, at St. Pancras, Ipswich, to LUCY DOREEN, daughter of Mr. and Mrs. W. O. JOLLY, The Grange, Kesgrave, Ipswich.

### To be Married

The marriage between ELLACOTT L. S. WARD, R.A.F., only son of Lieut.-Col. E. L. Ward, C.B.E., I.M.S. (retired), and Mrs. Ward, Sidcup, Kent, and SYLVIA, eldest daughter of Lieut.-Col. F. ETHERIDGE, D.S.O., 5th/7th Rajput Regt. and Mrs. Etheridge, Exmouth, will take place at Littleham, Exmouth, on August 14.

The engagement is announced between ROBERT WILLIAM LOWRY GLENN, R.A.F., son of the late Rev. William Glenn, of The Rectory, Pomeroy, County Tyrone, Ireland, and Mrs. Glenn, and CHRISTIAN, only daughter of DAVID LESLIE BEATH, O.B.E., M.R.C.S., L.R.C.P., and Mrs. Leslie Beath, of Clan House, Bath.

The engagement is announced between Mr. PHILIP NORMAN ROMAINE HALLWARD, the Border Regt. (attached R.A.F.), younger son of Mr. and Mrs. N. L. Hallward, of Westcote, Dunsfold, Godalming, Surrey, and Miss BERYL SWEET, only daughter of Mr. and Mrs. W. McM. Sweet, of the Woodlands, Limpley Stoke, Bath.

### Birth

HUTCHINSON.—On July 1, at 139, Gordon Road, West Bridgford, Notts, to ELSIE, wife of F./O. N. E. DAVIS HUTCHINSON, a daughter.

### Vacancies for Apprentice Clerks—Royal Air Force.

THE Air Ministry announces 60 vacancies exist in the Royal Air Force for well-educated boys, between the ages of 15½ and 17, to enter as apprentice clerks. 30 vacancies will be filled in October next and 30 in January, 1930. Some of the posts will be filled by means of an open competition which will be held by the Civil Service Commissioners in October at various centres (for entry in January, 1930), and the remainder by direct entry of boys who have obtained an approved school certificate. Successful candidates will be required to complete, in addition to the training period, 12 years' Regular Air Force service after reaching the age of 18. At the age of 30 they may return to civil life or may be permitted to re-engage to complete time for pension.

Boys entered under this scheme undergo a two years' course of training in clerical duties, typewriting, shorthand, bookkeeping and practical office routine, during which time their general education is continued under a staff of graduate teachers. The apprentice clerks are paid 1s. a day for the first year and 1s. 6d. a day afterwards. The subsequent commencing rates of pay, varying from 3s. to 4s. 6d. a day (21s. to 31s. 6d. a week), depend upon the degree of success they achieve at their final examination. In addition, they receive free board and lodging. Detailed information regarding the apprentice clerk scheme can be obtained from the Royal Air Force, Gwydyr House, Whitehall, S.W.1.

## PUBLICATIONS RECEIVED

*Particulars of Meteorological Reports issued by Wireless Telegraphy in Great Britain and the Countries of Europe and North Africa, 1929.* M.O. 252. H.M. Stationery Office, Kingsway, London, W.C.2. Price 5s. net.

*Aeronautical Research Committee Reports and Memoranda : No. 1201 (E. 29).—On the Stiffness of Crankshafts.* By H. Constant. October, 1928. Price 1s. net. No. 1213 (Ae. 372).—Wind Tunnel Tests of Aerofoils with Pilot Planes. By F. B. Bradfield and K. W. Clarke. November, 1928. Price 1s. 3d. net. H.M. Stationery Office, Kingsway, London, W.C.2.

*The Book of the Aeroplane.* By Capt. L. L. Pritchard. Longmans, Green and Co., Ltd., 39, Paternoster Row, London, E.C. Price 7s. 6d.

*Aeronautical Research Committee Reports and Memoranda : No. 1195.—A Mechanical Method for Solving Problems of Flow in Compressible Fluids.* By G. I. Taylor and C. F. Sharman. Aug. 1928. Price 1s. net.

No. 1197 (Ae. 358).—Wing Flutter Experiments upon a Model of a Single Seater Biplane. By W. G. A. Perring. Nov., 1928. Price 1s. 3d. net.

No. 1216 (Ae. 375).—The Lift and Pitching Moment of an Aerofoil due to a Uniform Angular Velocity of Pitch. By H. Glauert. Nov., 1928. Price 9d. net. No. 1219 (M. 59).—Investigation into the Proposed use of a Sand Cast Test Bar for Specification Purposes for Aluminium Alloys. By W. Rosenhain and S. L. Archbutt. Jan., 1929. Price 6d. net.

No. 1225 (Ae. 380).—Wind Tunnel Tests of a R.A.F. 30 Wing Fitted with a Self-Setting Slotted Wing (Pilot Plane). By F. B. Bradfield and S. Scott Hall. May, 1927. Price 9d. net. No. 1226 (Ae. 381).—The Characteristics of a Tapered and Twisted Wing with Sweep-back. By H. Glauert and S. B. Gates. Dec., 1928. Price 1s. net. No. 1236 (Ae. 391). The Control of the Fokker F. VII.-3M Aeroplane. Interim Report by the Stability and Control Panel. March, 1927. Price 4d. net. H.M. Stationery Office, Kingsway, London, W.C.2.

*The Fund Journal No. 1.—The Motor and Cycle Trades Benevolent Fund, 154, Clerkenwell Road, London, E.C.1.*

*International Airports.* By Stedman S. Hanks. The Ronald Press Co., New York. Simpkin Marshall, Ltd., 4, Stationers' Hall Court, London, E.C. Price 21s. net

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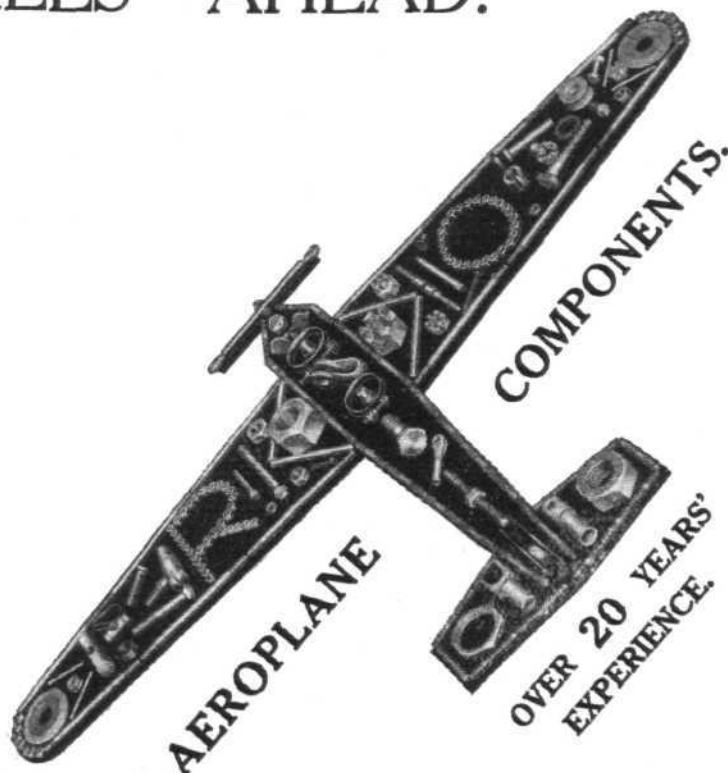
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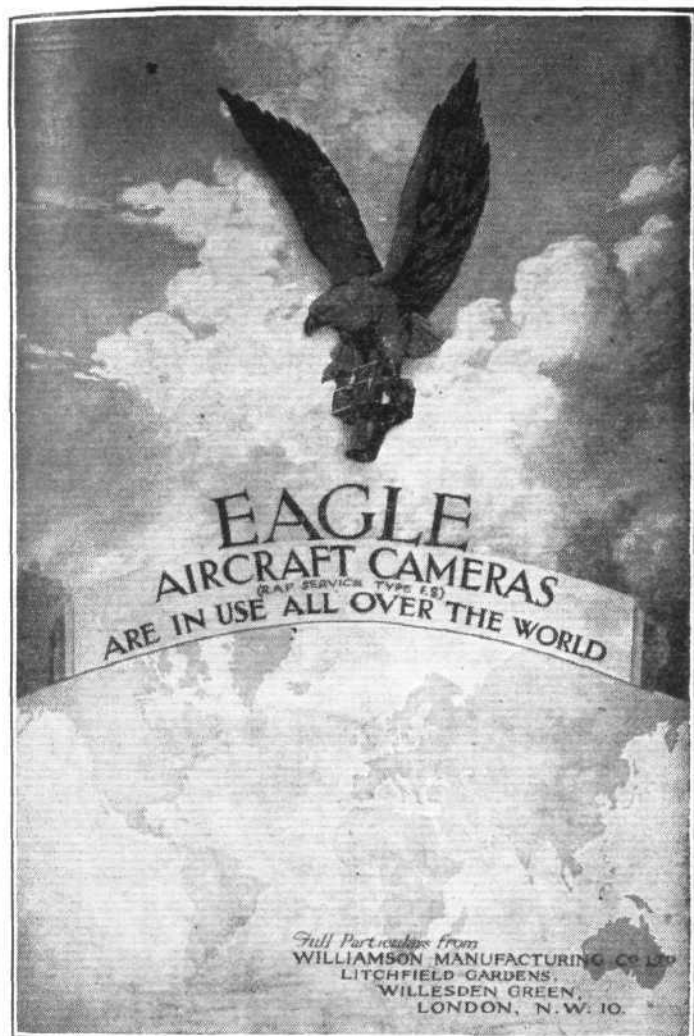
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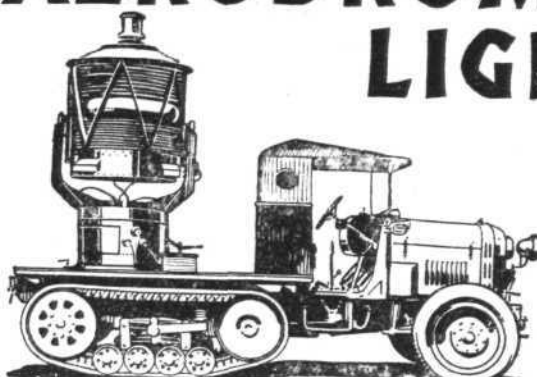
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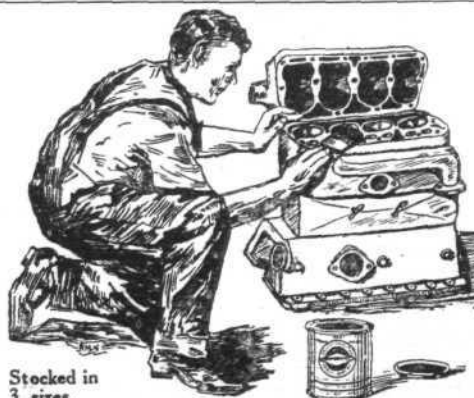
<b>A</b>		<b>F</b>		<b>N</b>	
Accurate Recording Instrument Co., Ltd. ....	75	Fairey Aviation Co., Ltd. ....	12	Napier, D., & Son Ltd. ....	21
A.D.C. Aircraft, Ltd. ....	16	Farman Aeroplanes ....	63	National Benzole Co., Ltd. ....	42
Aerodrome Construction Co. ....	85	Firth, Thos., & Sons Ltd. ....	30	National Flying Services Ltd. ....	62
Aero Hire, Ltd. ....	85	Fokker Aircraft Co. ....	59		
Aeronautical & Panel Plywood Co., Ltd. Front Cover		Ford Motor Co., Ltd. ....	33	<b>P</b>	
Aircraft Materials Ltd. ....	85			Palmer Tyre Ltd. ....	24
Aircraft Operating Co., Ltd. ....	64	<b>G</b>		Parnall, Geo., & Co., Ltd. ....	9
Airship Development Co., Ltd., The ....	81	Gale & Polden, Ltd. ....	74	Patent Motor Products ....	84
Aircrew Co. ....	7	Gieves Ltd. ....	77	Powerplus 1927, Ltd. ....	77
Airwork Ltd. ....	11	Glenny & Henderson ....	19		
Alan Cobham Aviation Ltd. ....	86	Gloster Aircraft Co., Ltd. ....	43, 44, 45 & 46	<b>R</b>	
Anglo American Oil Co., Ltd. ....	39	Goldsmiths & Silversmiths Co., Ltd. ....	54	Redline Motor Spirit ....	—
Argus Motors ....	64			Reid & Segrist Ltd. ....	38
Armstrong Siddeley Motors Ltd. ....	Special Inset	<b>H</b>		Reynolds Tube Co., Ltd. ....	70
Askania Werk ....	6	Habershon, I. I., & Son Ltd. ....	82	R.F.D. Company ....	19
		Harvey, Frost & Co., Ltd. ....	69	Ripon Steel Co. ....	5
<b>B</b>		Hawker Engineering Co., Ltd. ....	34	Roe, A. V., & Co., Ltd. ....	26 & 27
Blackburn Aeroplane & Motor Co., Ltd. ....	20	Hobdell Way & Co. ....	5	Rohrbach Metall Flugzeugban ....	8
Bonella, D. H., & Son, Ltd. ....	70	Hoffmann Roller Bearings Co., Ltd. ....	51	Rolls Royce Ltd. ....	23
Booth, James, & Co., (1915) Ltd. ....	83	Hughes, H. & Son ....	76	Rotherham & Sons Ltd. ....	79
Boulton & Paul Ltd. ....	22			Rubery, Owen & Co. ....	79
Bristol Aeroplane Co., Ltd. ....	Inside Cover	<b>I</b>		Russian Oil Products Ltd. ....	80
	Back Cover, 40 & 41	Imperial Airways ....	82		
British Aluminium Co., Ltd. ....	Front Cover & 55	Industrial Rubber Mfrs. Ltd. ....	83	<b>S</b>	
British Aviation Insurance Group ....	78	International Correspondence Schools Ltd. ....	82	Saunders, S. E., Ltd. ....	47
British Cellanese Co., Ltd. ....	80	Irvin Airchute of Gt. Britain Ltd. ....	Inside Back Cover	Scintilla Ltd. ....	71
British Instrument Co. ....	73			Serek Radiators, Ltd. ....	—
British Maxium Ltd. ....	82	<b>J</b>		Shell Mex Ltd. ....	25-31, 37-57
British Russell Parachute Co., Ltd. ....	6	Jones, A.E., Ltd. ....	83	Short Bros., Ltd. ....	18 & 19
British Thomson-Houston Co., Ltd. ....	28			Silvertown Lubricants Ltd. ....	75
Brown Brothers Ltd. ....	5	<b>K</b>		Simmonds Aircraft Ltd. ....	34
Bruntons Ltd. ....	62	Kayser Ellison & Co., Ltd. ....	—	Sir W. G. Armstrong Whitworth Aircraft Ltd. ....	Special Inset
Burch's ....	79	Kelvin, Bottomley & Baird Ltd. ....	78	Smith, S., & Sons, M.A. Ltd. ....	53
		KLG Plugs Ltd. ....	—	Splintex Safety Glass Co. ....	73
<b>C</b>		Kremer, N., & Sons ....	77	Stanford Ltd. ....	81
Cellon Ltd. ....	Front Cover & 17			Stevens, J. A., Ltd. ....	68
Cierva Auto-Giro Ltd. ....	74	<b>L</b>		Supermarine Aviation Wks. Ltd. ....	13
Cirrus Aero Engines Ltd. ....	48 & 49	Lewis, D. ....	86		
Clifford, C., & Son, Ltd. ....	85	Lewis, S. ....	86	<b>T</b>	
Comper Aircraft Co., Ltd. ....	72	Lodge Plugs Ltd. ....	29	Tecalemit Ltd. ....	76
Coan, R. W., Ltd. ....	85	London Electric Firm, The ....	83	Titanine Emallite Ltd. ....	Front Cover & 36
		Lorraine Engine ....	71	Triplex Safety Glass Co., Ltd. ....	58
<b>D</b>					
De Havilland Aircraft Co., Ltd. ....	32	<b>M</b>		<b>V</b>	
Desoutter Aircraft Co., Ltd. ....	61	Metal Propellers Ltd. ....	60	Vacuum Oil Co., Ltd. ....	—
Desoutter Bros. ....	56	Meyrowitz, E. B., Ltd. ....	69	Vickers Aviation Ltd. ....	14 & 15
Duckham, Alexander, & Co., Ltd. ....	35	Midland Motor Cylinder Co., Ltd. ....	67		
Dunlop Rubber Co., Ltd. ....	65	Model Manufacturers, Ltd. ....	81	<b>W</b>	
		Mono Spar Co., Ltd. ....	52	Wainwrights ....	88
<b>E</b>		Moss, J. ....	72	Wakefield, C. C., & Co., Ltd. ....	80
E.S.A. Esavian House ....	—	Mount, J. C., & Co. ....	84	Westland Aircraft Works ....	65
				Williamson Manfg. Co., Ltd. ....	81
				<b>Y</b>	
				Yacco Oil ....	66

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July, 1929.

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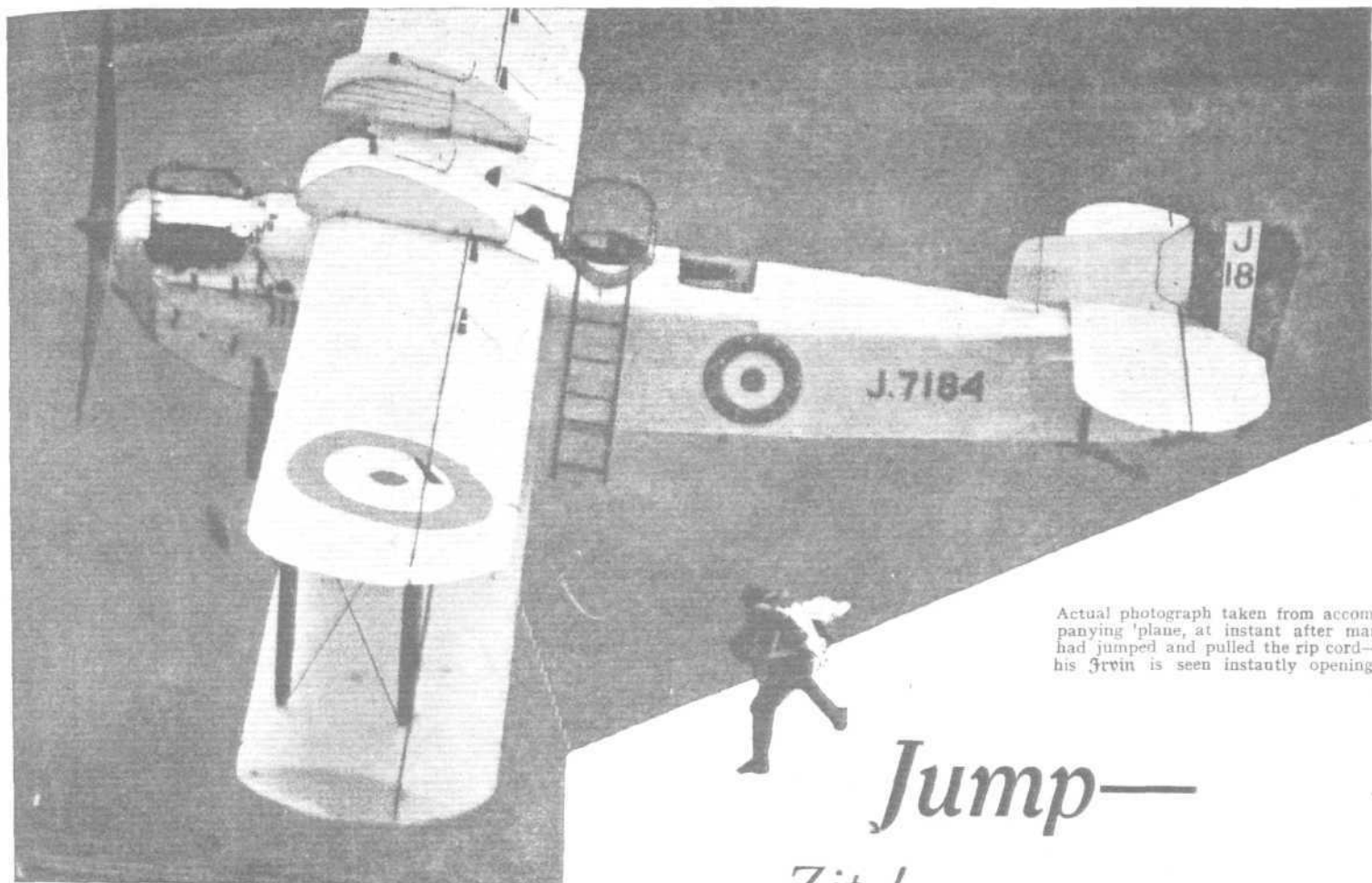
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